

SIX-BOOK SERIES

STRAYER-UPTON
ARITHMETICS

BOOK TWO

WITH ANSWERS

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SIX-BOOK SERIES

STRAYER-UPTON ARITHMETICS

BOOK TWO

BY

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AMERICAN BOOK COMPANY
NEW YORK CINCINNATI CHICAGO
BOSTON ATLANTA

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STRAYER-UPTON ARITHMETICS, BOOK TWO

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PREFACE

THIS series of books aims to give the child the ability to compute easily and accurately, and to enable him to interpret and solve the quantitative situations which he will meet in life. In the achievement of this aim, these books incorporate the most valuable findings of modern experimentation in the teaching of arithmetic, including the results of important researches conducted by the authors themselves during the past ten years. These books conform to the best modern courses of study and present only those methods and materials which have been thoroughly tested in the classroom by many experienced teachers. In no place do they introduce untried theories.

It is an established principle of teaching that nothing stimulates a pupil's interest so much as the satisfaction he gets from his ability to do things successfully. If he finds himself steadily perfecting new skills in arithmetic, he will look forward to his arithmetic period and will approach each new problem with intelligent interest. In accordance with this principle, these texts require the pupil to take only one new step at a time and supply him with enough exercises to assure mastery of that step before proceeding to the next one. Thus the constant stimulus of success is made possible for the pupil.

In this book the following additional features are to be noted :

1. The book is written for children, in language with which they are familiar.

2. The problems relate to the life and interests of the pupils. Artificial and technical problems have been avoided.

3. New points are explained as simply as possible, and each accomplishment is applied in new situations as soon as it is acquired.

4. The abstract exercises have been so constructed as to provide drill on all the fundamental number combinations, with ample repetition of those recognized as most difficult. The pupil thereby acquires that automatic mastery of the basic combinations which is so essential to rapid and accurate computation.

5. Checking is taught early in the presentation of each new operation and is emphasized throughout the book.

6. Subtraction is presented in such a way as to avoid many of the difficulties usually encountered in the teaching of this subject.

7. In long division a new and extensive gradation of materials is given, which greatly simplifies the teaching of this important topic.

8. Special provision has been made for the individual differences of pupils by the inclusion of a large number of carefully graded exercises. From these the teacher can easily select the types of drill material suitable to meet the needs of special groups of pupils.

This book covers the work that is usually done in the fourth grade.

GEORGE DRAYTON STRAYER
CLIFFORD BREWSTER UPTON

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BOOK TWO

CHAPTER I

NUMBERS OF SIX FIGURES

1. You often see numbers of five and six figures in newspapers and magazines, on the license plates of automobiles, and in other places. You also need such numbers when you write the populations of any of the large cities.

2. This is the way large numbers are read :

40,000 is read *40 thousand*.
85,462 is read *85 thousand, 462*.
74,005 is read *74 thousand, 5*.
100,000 is read *100 thousand*.
253,897 is read *253 thousand, 897*.
900,100 is read *900 thousand, 100*.

3. You will find it easier to read a number having more than four figures if you put a comma between each group of three figures, counting from the right. Such groups are called **periods**. The first period, beginning at the right, is called the *units' period*; the second period is called the *thousands' period*.

Thousands	Units
7 5 3	4 9 2

4. Read each period in a large number as if it were a number by itself. Thus, the number 753,492 is read *753 thousand, 492*.

USING LARGE NUMBERS

Read these sentences:

1. The president of the United States receives a salary of \$75,000 a year.

2. It is 12,911 miles from New York to Hong-kong, China, by way of the Panama Canal.

3. Last week one store sold \$48,711.82 worth of household goods.

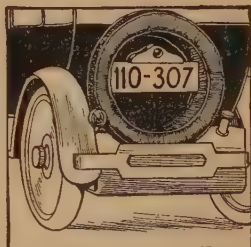
Read these automobile license numbers:

4. 75,328 430,097 800,000

5. 68,100 523,071 884,502

6. 94,060 703,090 700,911

7. 10,771 987,500 600,008



On automobile license plates a hyphen is often used instead of a comma, as in the picture. 110-307 may be read *one one o, three o seven*, zero being read like the letter *o*.

8. *Write the following numbers in figures:*

Sixty-seven thousand four hundred eight

Five hundred eight thousand one hundred nine

Two hundred eighty-nine thousand seven

Six hundred seven thousand five hundred one

9. What is the largest number that you can write with 4 figures? with 5 figures? with 6 figures? What is the smallest number that you can write with 4 figures? with 5 figures? with 6 figures?

AN ADDITION MATCH

The class is divided into two teams, the Reds and the Blues. These teams stand on opposite sides of the room, as in a spelling match. They have their books with them. The first Red does ex. 1 below at sight. The first Blue does ex. 2, and so on. If any one misses, he takes his seat and the next pupil on the other team does the example. The team with most pupils standing at the end wins.

Add the following :

1. $\begin{array}{r} 68 \\ 7 \\ \hline \end{array}$	5. $\begin{array}{r} 57 \\ 4 \\ \hline \end{array}$	9. $\begin{array}{r} 24 \\ 6 \\ \hline \end{array}$	13. $\begin{array}{r} 49 \\ 7 \\ \hline \end{array}$	17. $\begin{array}{r} 38 \\ 6 \\ \hline \end{array}$	21. $\begin{array}{r} 66 \\ 8 \\ \hline \end{array}$
2. $\begin{array}{r} 37 \\ 6 \\ \hline \end{array}$	6. $\begin{array}{r} 27 \\ 8 \\ \hline \end{array}$	10. $\begin{array}{r} 44 \\ 7 \\ \hline \end{array}$	14. $\begin{array}{r} 46 \\ 7 \\ \hline \end{array}$	18. $\begin{array}{r} 69 \\ 4 \\ \hline \end{array}$	22. $\begin{array}{r} 37 \\ 5 \\ \hline \end{array}$
3. $\begin{array}{r} 28 \\ 6 \\ \hline \end{array}$	7. $\begin{array}{r} 58 \\ 5 \\ \hline \end{array}$	11. $\begin{array}{r} 35 \\ 9 \\ \hline \end{array}$	15. $\begin{array}{r} 66 \\ 9 \\ \hline \end{array}$	19. $\begin{array}{r} 78 \\ 9 \\ \hline \end{array}$	23. $\begin{array}{r} 87 \\ 9 \\ \hline \end{array}$
4. $\begin{array}{r} 45 \\ 6 \\ \hline \end{array}$	8. $\begin{array}{r} 55 \\ 7 \\ \hline \end{array}$	12. $\begin{array}{r} 39 \\ 8 \\ \hline \end{array}$	16. $\begin{array}{r} 63 \\ 7 \\ \hline \end{array}$	20. $\begin{array}{r} 49 \\ 6 \\ \hline \end{array}$	24. $\begin{array}{r} 35 \\ 8 \\ \hline \end{array}$

Count as follows :

- | | |
|--------------------------|---------------------------|
| 25. By 4's from 1 to 25. | Thus, 1, 5, 9, and so on. |
| 26. By 4's from 2 to 26. | 30. By 6's from 3 to 39. |
| 27. By 5's from 2 to 32. | 31. By 7's from 2 to 44. |
| 28. By 5's from 4 to 34. | 32. By 8's from 1 to 41. |
| 29. By 6's from 1 to 37. | 33. By 9's from 1 to 46. |

EXERCISES IN ADDITION

Add without copying, and check the work:

1. 7	2. 6	3. 6	4. 4	5. 3	6. 8	7. 5
0	4	2	5	8	1	6
6	8	7	7	0	6	1
3	5	4	0	7	5	5
4	6	9	2	9	9	6
5	5	4	7	6	9	7

8. 1	9. 4	10. 1	11. 4	12. 7	13. 1	14. 3
7	2	0	6	0	0	0
2	3	6	3	8	3	1
5	5	8	5	3	2	1
7	9	4	8	8	9	5
1	8	9	4	7	7	9

Copy and add these as rapidly as you can:

15. \$311.73	16. \$196.09	17. \$712.54	18. \$184.23
88.64	8.20	80.02	9.71
54.86	403.17	792.67	36.73
95.06	4.86	49.87	540.06
624.17	695.99	4.46	53.88

Add without copying. Practice until you can do and check these 5 examples in 7 minutes:

19. 283	20. 170	21. 422	22. 190	23. 126
485	869	824	345	540
920	374	812	131	999
761	705	369	377	915
659	448	687	544	108
344	153	294	633	625

ADDING LONG COLUMNS

Add the following and check the work:

1. 80	2. 54	3. 85	4. 81	5. 40	6. 93
66	12	26	20	44	71
75	79	56	49	14	46
98	70	30	60	22	32
13	85	99	75	85	24
76	19	17	59	65	73
34	69	39	27	79	59

7. 21	8. 39	9. 58	10. 96	11. 55	12. 58
95	92	89	77	94	24
93	68	13	60	58	85
12	10	70	65	63	60
30	49	27	86	20	74
88	12	15	37	17	84
57	83	34	92	86	38
64	48	18	68	98	15

Add without copying. Practice until you can do and check these 8 examples in 6 minutes:

13. 4	14. 9	15. 7	16. 6	17. 4	18. 7	19. 3	20. 3
9	8	1	3	4	6	2	6
7	7	4	5	8	2	6	7
3	2	5	2	8	9	5	2
0	6	0	9	1	4	0	1
4	2	6	4	6	0	8	0
6	4	1	3	0	9	7	5
3	0	9	6	9	2	3	4
7	4	0	3	1	8	9	9
6	9	7	8	8	8	3	5

HOW MUCH SHOULD YOU WEIGH?

How Much Boys Should Weigh

HEIGHT IN INCHES	AGE				
	8 yr.	9 yr.	10 yr.	11 yr.	12 yr.
42	44				
43	46				
44	47		These numbers are pounds		
45	48	49			
46	50	51			
47	52	53	54		
48	55	55	56	57	
49	57	58	58	59	
50	59	60	60	61	62
51	61	62	63	64	65
52	63	64	65	67	68
53	66	67	68	69	70
54	69	70	71	72	73
55	..	73	74	75	76
56	..	77	78	79	80
57	..	..	81	82	83
58	..	..	84	85	86

How Much Girls Should Weigh

HEIGHT IN INCHES	AGE				
	8 yr.	9 yr.	10 yr.	11 yr.	12 yr.
42	43				
43	44				
44	46		These numbers are pounds		
45	48	49			
46	50	51			
47	51	52	53		
48	53	54	55	56	
49	55	56	57	58	
50	57	58	59	60	61
51	60	61	62	63	64
52	63	64	65	66	67
53	66	67	68	68	69
54	68	69	70	71	72
55	..	72	73	74	75
56	..	76	77	78	79
57	..	..	81	82	83
58	..	..	85	86	87

To use these tables, you must know how old you are and how many inches tall you are. Then the table will tell you how many pounds you should weigh. If you are a boy 9 years old and 47 inches tall, the table tells you that you should weigh 53 pounds. If you are a girl 8 years old and 45 inches tall, the table tells you that you should weigh 48 pounds.

Find out how tall and how heavy you are. Are you overweight or underweight?

ARE THESE CHILDREN UNDERWEIGHT?

1. The teacher is finding how tall and how heavy the children of her class are. She writes the results in the chart below. Find the difference between each child's weight and the amount he should weigh according to the table on page 6.



2. Which of the children are underweight?

3. Which of the children are overweight?

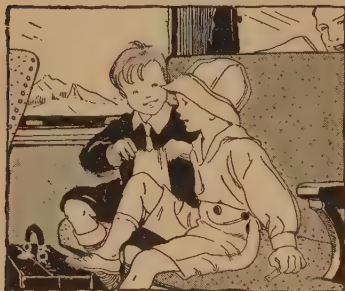
4. Is any child exactly the right weight?

Boys				
No.	Name	Age	Height	Weight
1	Abner	9	51	57
2	Billy	10	54	67
3	Dan	11	57	75
4	Edgar	10	54	64
5	Fred	10	51	67
6	Jerry	10	51	70
7	Jesse	9	52	73
8	Mark	9	46	51
9	Nat	9	51	59
10	Peter	8	50	65
11	Ralph	9	48	48
12	Rollo	10	48	60

GIRLS				
No.	Name	Age	Height	Weight
13	Anna	9	49	49
14	Betty	10	52	74
15	Clara	11	51	71
16	Doris	10	51	58
17	Grace	9	48	49
18	Helen	11	50	54
19	Ida	8	50	48
20	Julia	9	52	58
21	Maud	8	51	57
22	Nora	9	51	56
23	Polly	9	50	60
24	Susan	10	51	70

VACATION TRIPS

1. Fred went to Clear Lake. These were his expenses: Railroad fare, \$4.46; bus from station, \$.50; board, \$13.50; trips, \$.75; rowboat, \$2.75; bathing suit, \$1.25; sneakers, \$1.19. How much did the trip cost?



2. Tom visited his aunt. He paid \$12.74 for railroad fare, \$2.59 for a book for his aunt, \$3.75 for a tennis racket, \$.65 for candy, \$2.50 to rent a canoe, \$.79 for fishing tackle, and \$5.50 for a suit case. How much did his trip cost?

3. Alice went to camp for a week. She paid \$4.27 for railroad fare, \$15.00 for board, \$2.39 for a dress, \$3.39 for shoes, \$.55 for a knapsack, and \$.84 for a flashlight. How much did her trip cost?

4. Doris went to Bass Lake for a month. The first week she spent \$4.25; the second week, \$5.15; the third week, \$6.23; and the fourth week, \$5.35. How much did she spend in all?

5. Ray and Bob went camping. They paid \$14.75 for food, \$7.25 to rent a boat, \$2.75 for a sail, \$4.35 to rent a tent, and \$1.14 for a hatchet. Find the total cost of the trip. If the boys shared the expense equally, how much did each pay?

THE 100 ADDITION COMBINATIONS

Practice these until you can give all the sums orally in 2 minutes. The ones in black type are the hardest.

1.	3	1	4	1	6	0	1	6	2	1
	6	5	7	1	1	7	2	6	2	0
2.	3	7	5	8	5	5	3	6	2	0
	9	4	3	6	0	9	4	3	6	3
3.	7	9	3	4	0	1	5	4	7	6
	9	4	2	4	8	7	6	0	2	8
4.	3	4	8	2	0	4	7	6	1	9
	1	5	2	0	9	1	5	4	3	1
5.	6	3	5	4	4	2	4	5	1	0
	7	0	4	8	6	4	9	1	8	6
6.	5	7	0	3	6	2	5	9	5	4
	7	7	2	3	5	8	5	0	8	2
7.	2	7	2	0	8	6	1	7	9	3
	1	8	3	1	3	9	4	0	3	8
8.	6	9	8	7	6	3	9	2	8	8
	2	2	8	6	0	5	6	7	0	1
9.	8	5	9	7	1	0	2	7	9	8
	5	2	8	1	9	0	9	3	5	4
10.	9	4	3	0	9	8	1	2	8	0
	9	3	7	4	7	7	6	5	9	5

THE 100 SUBTRACTION COMBINATIONS

Practice these until you can give all the differences orally in 2 minutes. Those in black type are the hardest.

1.	<u>6</u> 3	<u>11</u> 2	<u>9</u> 4	<u>6</u> 0	<u>8</u> 3	<u>9</u> 6	<u>16</u> 7	<u>7</u> 3	<u>13</u> 4	<u>8</u> 1
2.	<u>2</u> 2	<u>10</u> 9	<u>15</u> 6	<u>3</u> 0	<u>5</u> 1	<u>12</u> 6	<u>9</u> 5	<u>14</u> 8	<u>2</u> 1	<u>9</u> 8
3.	<u>5</u> 4	<u>9</u> 0	<u>11</u> 3	<u>10</u> 4	<u>6</u> 1	<u>8</u> 5	<u>4</u> 3	<u>7</u> 5	<u>12</u> 5	<u>4</u> 4
4.	<u>1</u> 0	<u>11</u> 4	<u>8</u> 8	<u>3</u> 1	<u>9</u> 7	<u>2</u> 0	<u>15</u> 7	<u>7</u> 4	<u>4</u> 2	<u>14</u> 9
5.	<u>6</u> 5	<u>12</u> 3	<u>10</u> 6	<u>7</u> 0	<u>11</u> 7	<u>5</u> 3	<u>9</u> 1	<u>16</u> 9	<u>8</u> 7	<u>17</u> 8
6.	<u>8</u> 4	<u>6</u> 2	<u>4</u> 0	<u>13</u> 5	<u>10</u> 8	<u>14</u> 5	<u>4</u> 1	<u>10</u> 5	<u>3</u> 2	<u>11</u> 5
7.	<u>5</u> 0	<u>9</u> 9	<u>12</u> 7	<u>10</u> 7	<u>5</u> 5	<u>13</u> 9	<u>6</u> 4	<u>14</u> 7	<u>3</u> 3	<u>14</u> 6
8.	<u>5</u> 2	<u>7</u> 2	<u>0</u> 0	<u>8</u> 2	<u>7</u> 7	<u>11</u> 8	<u>12</u> 4	<u>7</u> 1	<u>6</u> 6	<u>12</u> 8
9.	<u>11</u> 9	<u>13</u> 6	<u>1</u> 1	<u>9</u> 3	<u>10</u> 2	<u>10</u> 1	<u>15</u> 8	<u>8</u> 6	<u>17</u> 9	<u>8</u> 0
10.	<u>7</u> 6	<u>13</u> 7	<u>10</u> 3	<u>9</u> 2	<u>11</u> 6	<u>12</u> 9	<u>15</u> 9	<u>13</u> 8	<u>16</u> 8	<u>18</u> 9

REVIEW OF SUBTRACTION

Subtract rapidly:

1.	36	55	34	52	65	66	84	75	95
	<u>17</u>	<u>26</u>	<u>18</u>	<u>15</u>	<u>17</u>	<u>29</u>	<u>37</u>	<u>48</u>	<u>49</u>

Show how a clerk would make change from 50¢ for purchases of each of the following amounts:

2.	33	28	17	36	15	38	46	31
----	----	----	----	----	----	----	----	----

3.	19	11	48	27	45	39	25	44
----	----	----	----	----	----	----	----	----

Subtract without copying. Practice until you can subtract and check 10 examples correctly in 5 minutes:

4.	623	7.	860	10.	820	13.	933	16.	856
	<u>266</u>		<u>472</u>		<u>680</u>		<u>479</u>		<u>648</u>

5.	731	8.	630	11.	571	14.	727	17.	461
	<u>352</u>		<u>506</u>		<u>175</u>		<u>199</u>		<u>308</u>

6.	464	9.	700	12.	689	15.	833	18.	924
	<u>268</u>		<u>423</u>		<u>490</u>		<u>334</u>		<u>417</u>

Subtract without copying. Practice until you can subtract and check 10 examples correctly in 6 minutes:

19.	2841	22.	7507	25.	5631	28.	8533
	<u>1583</u>		<u>650</u>		<u>3544</u>		<u>5095</u>

20.	8350	23.	4602	26.	1953	29.	9645
	<u>2651</u>		<u>842</u>		<u>97</u>		<u>7939</u>

21.	5010	24.	8458	27.	3851	30.	7005
	<u>2387</u>		<u>1492</u>		<u>1776</u>		<u>2631</u>

LARGER NUMBERS IN SUBTRACTION

A city had 43,568 inhabitants in a certain year and 70,002 inhabitants ten years later. How many inhabitants did it gain in the ten years?

Subtract by thinking as follows:

" $8 + 4 = 12$." Write 4, and carry 1.

"1 (carried) + $6 + 3 = 10$." Write 3,

and carry 1.

"1 (carried) + $5 + 4 = 10$." Write 4, and carry 1.

"1 (carried) + $3 + 6 = 10$." Write 6, and carry 1.

"1 (carried) + $4 + 2 = 7$." Write 2. Check by adding up.

The city gained 26,434 inhabitants during the ten years.

The number from which you subtract is called the **minuend**.

The number subtracted is called the **subtrahend**.

The answer is called the **difference** or **remainder**.

Exercises

1. A jeweler has a glass jar full of beads in his window, with a notice that he will give a string of beads to any one who guesses within 75 beads of the number in the jar. Clara guesses 1936 beads. Should she get the string if the jar contains 2005 beads?

2. Jack earned \$148.50. He spent \$87.75 for clothes, books, and a trip. How much had he left?

3. Mrs. Blake wanted a rug that cost \$375.00. She waited and got it at a sale for \$249.50. How much did she save by buying it at the sale?

SUBTRACTING LARGER NUMBERS

Copy, and subtract. Practice until you can do and check 8 examples in 6 minutes (after copying):

- | | | | |
|--|--|---|---|
| 1. $\begin{array}{r} 50641 \\ 32462 \\ \hline \end{array}$ | 5. $\begin{array}{r} 69563 \\ 16789 \\ \hline \end{array}$ | 9. $\begin{array}{r} 81632 \\ 40676 \\ \hline \end{array}$ | 13. $\begin{array}{r} 70000 \\ 53215 \\ \hline \end{array}$ |
| 2. $\begin{array}{r} 97831 \\ 62889 \\ \hline \end{array}$ | 6. $\begin{array}{r} 71497 \\ 44659 \\ \hline \end{array}$ | 10. $\begin{array}{r} 52429 \\ 18830 \\ \hline \end{array}$ | 14. $\begin{array}{r} 87514 \\ 47964 \\ \hline \end{array}$ |
| 3. $\begin{array}{r} 86305 \\ 57510 \\ \hline \end{array}$ | 7. $\begin{array}{r} 78370 \\ 32996 \\ \hline \end{array}$ | 11. $\begin{array}{r} 73816 \\ 34098 \\ \hline \end{array}$ | 15. $\begin{array}{r} 45111 \\ 30383 \\ \hline \end{array}$ |
| 4. $\begin{array}{r} 46900 \\ 23591 \\ \hline \end{array}$ | 8. $\begin{array}{r} 64320 \\ 17730 \\ \hline \end{array}$ | 12. $\begin{array}{r} 75001 \\ 24302 \\ \hline \end{array}$ | 16. $\begin{array}{r} 65401 \\ 46399 \\ \hline \end{array}$ |

17. Anthony has \$82.50 in the bank. If Sarah has \$130.26, how much more has she than Anthony?

Subtract the following and check your work:

- | | | | |
|---|---|---|---|
| 18. $\begin{array}{r} \$507.21 \\ 143.54 \\ \hline \end{array}$ | 22. $\begin{array}{r} \$192.42 \\ 42.74 \\ \hline \end{array}$ | 26. $\begin{array}{r} \$830.53 \\ 633.85 \\ \hline \end{array}$ | 30. $\begin{array}{r} \$758.55 \\ 253.99 \\ \hline \end{array}$ |
| 19. $\begin{array}{r} \$373.24 \\ 195.75 \\ \hline \end{array}$ | 23. $\begin{array}{r} \$916.88 \\ 561.49 \\ \hline \end{array}$ | 27. $\begin{array}{r} \$824.91 \\ 570.33 \\ \hline \end{array}$ | 31. $\begin{array}{r} \$700.00 \\ 481.41 \\ \hline \end{array}$ |
| 20. $\begin{array}{r} \$751.35 \\ 265.42 \\ \hline \end{array}$ | 24. $\begin{array}{r} \$656.08 \\ 376.98 \\ \hline \end{array}$ | 28. $\begin{array}{r} \$724.83 \\ 580.96 \\ \hline \end{array}$ | 32. $\begin{array}{r} \$936.57 \\ 98.71 \\ \hline \end{array}$ |
| 21. $\begin{array}{r} \$628.41 \\ 67.98 \\ \hline \end{array}$ | 25. $\begin{array}{r} \$511.10 \\ 323.90 \\ \hline \end{array}$ | 29. $\begin{array}{r} \$808.73 \\ 58.78 \\ \hline \end{array}$ | 33. $\begin{array}{r} \$100.00 \\ 76.26 \\ \hline \end{array}$ |

MULTIPLYING AND DIVIDING BY 10

1. Count by 10's to 100.
2. How many are three 10's? seven 10's?
3. How many 10's are there in 40? in 60? in 80?
4. Learn these tables:

$1 \times 10 = 10$	$6 \times 10 = 60$	$10 \div 10 = 1$	$60 \div 10 = 6$
$2 \times 10 = 20$	$7 \times 10 = 70$	$20 \div 10 = 2$	$70 \div 10 = 7$
$3 \times 10 = 30$	$8 \times 10 = 80$	$30 \div 10 = 3$	$80 \div 10 = 8$
$4 \times 10 = 40$	$9 \times 10 = 90$	$40 \div 10 = 4$	$90 \div 10 = 9$
$5 \times 10 = 50$	$10 \times 10 = 100$	$50 \div 10 = 5$	$100 \div 10 = 10$

5. *Multiply the following at sight:*

10	10	10	10	10	10	10	10	10
<u>8</u>	<u>2</u>	<u>9</u>	<u>6</u>	<u>4</u>	<u>7</u>	<u>5</u>	<u>1</u>	<u>3</u>

6. Write the 10's table in another way, like this:
 $10 \times 1 = 10$, $10 \times 2 = 20$, and so on.

To multiply a number by 10, write a zero after it.

7. Find the cost of 10 pencils at 6¢ each.
8. How many 10-cent balls can you buy for 70¢?

Divide the following at sight:

9. $10 \overline{)70}$ $10 \overline{)40}$ $10 \overline{)10}$ $10 \overline{)30}$ $10 \overline{)80}$ $10 \overline{)50}$

Find $\frac{1}{10}$ of the following numbers:

10. 60 40 90 30 20 50 70 80 100 10

Multiply each of the following by 10:

11. 7 5 8 9 12 15 17 10 18 20

MULTIPLYING BY 10, 100, AND 1000

You learned on page 14 that you can multiply a number by 10 by writing a zero after it. Sometimes this is called *annexing* a zero.

To multiply a number by 10, annex a 0.

Multiply each of these numbers by 10 :

1.	7	14	28	50	120	459	1732
2.	9	33	90	69	383	670	1450

You know that 6×100 equals 600. Hence 100×6 also equals 600, because 100×6 is the same as 6×100 . Therefore you can multiply 6 by 100 by annexing 2 zeros to 6. In the same way, you can multiply 6 by 1000 by annexing 3 zeros to 6.

To multiply a number by 100, annex 2 zeros.

To multiply a number by 1000, annex 3 zeros.

Multiply each of these numbers by 100 :

3.	49	70	685	430	948	1498	564
----	----	----	-----	-----	-----	------	-----

4. Multiply each number in ex. 3 by 1000.

Find the cost of each of the following :

5. 10 oranges at 9¢ each 8. 100 hats at \$2 each
6. 10 melons at 17¢ each 9. 1000 stamps at 2¢ each
7. 100 pencils at 3¢ each 10. 100 qt. milk at 15¢ each
11. Find the number of cents in 10 dimes ; in 10 nickels ; in 10 quarters ; in 10 half dollars ; in 100 dimes ; in 100 quarters.

MULTIPLYING BY NUMBERS THAT END IN ZEROS

1. To multiply by 30 is the same as to multiply by 3×10 . Hence, to multiply by 30, multiply by 3 and annex a zero.

2. To multiply by 500 is the same as to multiply by 5×100 . Hence, to multiply by 500, multiply by 5 and annex 2 zeros.

3. To multiply by 7000, multiply by 7 and annex 3 zeros.

4. Arrange the work like this, letting the zeros stand out at the right :

17	15	18	126	43
20	50	400	200	3000
340	750	7200	25200	129000

Exercises

Multiply. Check by going over the work again :

1. 18	3. 163	5. 178	7. 39
30	500	800	2000
2. 21	4. 275	6. 633	8. 52
90	200	400	7000

Multiply and check :

9. 30×45	11. 400×635	13. 9000×163
10. 60×58	12. 500×186	14. 8000×250

15. Mr. Reed bought 400 rocking horses at \$3.22 each. How much did he pay for them?

DIVIDING BY 10 AND 100

1. If you divide 60 by 10, you get 6. An easy way to get the same answer is to remove the 0 from 60.

2. If you divide 400 by 100, you get 4. Can you get the same answer by removing two 0's from 400?

By removing one 0 from the right of a number, you divide the number by 10.

By removing two 0's from the right of a number, you divide the number by 100.

3. How could you divide a number like 8000 by 10? by 100? by 1000?

Exercises

Divide each of the following by 10 :

- | | | | | | |
|-------|-----|-----|-----|------|------|
| 1. 60 | 170 | 230 | 580 | 1450 | 3900 |
| 2. 40 | 280 | 180 | 200 | 1600 | 2000 |

Divide each of the following by 100 :

- | | | | | | |
|--------|-----|------|------|------|------|
| 3. 500 | 700 | 1600 | 4500 | 2700 | 4800 |
| 4. 300 | 900 | 2300 | 5000 | 7000 | 9000 |

5. Divide each number in ex. 3 and 4 by 10.

6. If 10 desks cost \$90, find the cost of 1 desk.

7. Mr. Allen paid \$400 for 100 pairs of shoes. How much did each pair cost?

8. How many dimes can you get for 80 cents? for 60 cents? for 250 cents? for 200 cents?

9. How many dollars can you get for 500 cents?

MULTIPLYING AND DIVIDING BY 11

1. There are 11 players on a football team. How many players are there on 2 teams? on 3 teams? on 5 teams?

2. Count by 11's to 110, beginning 11, 22, 33, and so on. What do you notice that makes it easy to count by 11's?

3. Learn these tables:

$1 \times 11 = 11$	$7 \times 11 = 77$	$11 \div 11 = 1$	$77 \div 11 = 7$
$2 \times 11 = 22$	$8 \times 11 = 88$	$22 \div 11 = 2$	$88 \div 11 = 8$
$3 \times 11 = 33$	$9 \times 11 = 99$	$33 \div 11 = 3$	$99 \div 11 = 9$
$4 \times 11 = 44$	$10 \times 11 = 110$	$44 \div 11 = 4$	$110 \div 11 = 10$
$5 \times 11 = 55$	$11 \times 11 = 121$	$55 \div 11 = 5$	$121 \div 11 = 11$
$6 \times 11 = 66$	$12 \times 11 = 132$	$66 \div 11 = 6$	$132 \div 11 = 12$

4. Write the 11's table with 11 as the first figure in the table, like this: $11 \times 1 = 11$, $11 \times 2 = 22$, and so on.

Divide each of the following numbers mentally by 11. Give only the quotient and the remainder:

5. 61 31 0 34 80 25 53 89

6. 39 98 67 41 75 9 20 6

7. How many football teams can be made with the 40 boys in our class? Will there be any boys left over?

8. Louise is buying 12 yd. of gold ribbon at 11¢ a yard. How much must she pay for it?

MULTIPLYING AND DIVIDING BY 12

1. How many inches are there in 1 ft.? in 5 ft.?
2. How many eggs are there in 4 dozen eggs?
3. Count by 12's to 144, beginning 12, 24, 36.
4. Learn these tables:

$1 \times 12 = 12$	$7 \times 12 = 84$	$12 \div 12 = 1$	$84 \div 12 = 7$
$2 \times 12 = 24$	$8 \times 12 = 96$	$24 \div 12 = 2$	$96 \div 12 = 8$
$3 \times 12 = 36$	$9 \times 12 = 108$	$36 \div 12 = 3$	$108 \div 12 = 9$
$4 \times 12 = 48$	$10 \times 12 = 120$	$48 \div 12 = 4$	$120 \div 12 = 10$
$5 \times 12 = 60$	$11 \times 12 = 132$	$60 \div 12 = 5$	$132 \div 12 = 11$
$6 \times 12 = 72$	$12 \times 12 = 144$	$72 \div 12 = 6$	$144 \div 12 = 12$

5. Remember: $9 \times 12 = 12 \times 9$

6. Write the table of 12's like this:

$12 \times 1 = 12$, $12 \times 2 = 24$, $12 \times 3 = 36$, etc.

7. Helen bought 6 dozen cookies for her party.
How many cookies did she buy?

8. Oranges are selling at 30¢ a dozen or at 3¢ apiece. How much will you save on 12 oranges by buying a dozen at a time? *

9. How many months are there in 7 years?

*Divide each of the following numbers mentally by 12.
Give only the quotient and the remainder:*

10. 50 37 0 48 11 35 83 98

11. 46 22 1 109 84 75 49 59

12. Ed sold 132 eggs. How many dozen was that?

MULTIPLYING BY A TWO-FIGURE NUMBER

A fast train running between Chicago and Portland, Oregon, travels 42 miles an hour and makes the trip in 43 hours. How many miles does it travel?

You must multiply 42 by 43.

Multiply 42 by 3, which gives 126. Write 126 so that the 6 is under the 3 of 43.

Multiply 42 by 4, which gives 168. Write 168 so that the 8 is under the 4 by which you multiplied.

Add 126 and 168 as they stand. This gives 1806 as the product.

$$\begin{array}{r} 42 \\ 43 \\ \hline 126 \\ 168 \\ \hline 1806 \end{array}$$

The train travels 1806 miles.

Check the work by going over it again.

126 and 168 are called **partial products**.

Exercises

1. Mr. Oliver travels 23 miles an hour in his automobile. How far can he travel in 12 hours?

2. Anna can make 43 artificial flowers in a day. How many can she make in 21 days?

3. It takes 48 stamps to fill each page of Jack's stamp book, and 42 pages are filled. How many stamps has he?

Multiply. Check the work by going over it again:

4. $\begin{array}{r} 34 \\ 21 \\ \hline \end{array}$	6. $\begin{array}{r} 23 \\ 32 \\ \hline \end{array}$	8. $\begin{array}{r} 42 \\ 21 \\ \hline \end{array}$	10. $\begin{array}{r} 33 \\ 13 \\ \hline \end{array}$	12. $\begin{array}{r} 43 \\ 22 \\ \hline \end{array}$	14. $\begin{array}{r} 62 \\ 23 \\ \hline \end{array}$
5. $\begin{array}{r} 59 \\ 32 \\ \hline \end{array}$	7. $\begin{array}{r} 37 \\ 53 \\ \hline \end{array}$	9. $\begin{array}{r} 68 \\ 92 \\ \hline \end{array}$	11. $\begin{array}{r} 87 \\ 45 \\ \hline \end{array}$	13. $\begin{array}{r} 59 \\ 22 \\ \hline \end{array}$	15. $\begin{array}{r} 72 \\ 34 \\ \hline \end{array}$

SCHOOL LUNCHROOM PROBLEMS

Check your work by going over it again.

1. The lunchroom buys 15 gallons of milk each day. A gallon of milk makes 16 glasses of milk. How many glasses are there in 15 gallons?

2. Each week 75 gallons of milk are used. How many gallons are used in the school year of 35 weeks?

3. About 65 apples are sold each day. In a month of 22 school days about how many apples are sold?

Practice until you can multiply and check 5 of the following examples in 5 minutes (after copying):

4. $\begin{array}{r} 83 \\ 52 \\ \hline \end{array}$	11. $\begin{array}{r} 64 \\ 68 \\ \hline \end{array}$	18. $\begin{array}{r} 84 \\ 43 \\ \hline \end{array}$	25. $\begin{array}{r} 34 \\ 27 \\ \hline \end{array}$	32. $\begin{array}{r} 34 \\ 82 \\ \hline \end{array}$	39. $\begin{array}{r} 37 \\ 64 \\ \hline \end{array}$
--	---	---	---	---	---

5. $\begin{array}{r} 84 \\ 49 \\ \hline \end{array}$	12. $\begin{array}{r} 58 \\ 48 \\ \hline \end{array}$	19. $\begin{array}{r} 23 \\ 97 \\ \hline \end{array}$	26. $\begin{array}{r} 79 \\ 15 \\ \hline \end{array}$	33. $\begin{array}{r} 63 \\ 17 \\ \hline \end{array}$	40. $\begin{array}{r} 16 \\ 94 \\ \hline \end{array}$
--	---	---	---	---	---

6. $\begin{array}{r} 49 \\ 65 \\ \hline \end{array}$	13. $\begin{array}{r} 75 \\ 47 \\ \hline \end{array}$	20. $\begin{array}{r} 63 \\ 43 \\ \hline \end{array}$	27. $\begin{array}{r} 68 \\ 51 \\ \hline \end{array}$	34. $\begin{array}{r} 42 \\ 28 \\ \hline \end{array}$	41. $\begin{array}{r} 35 \\ 98 \\ \hline \end{array}$
--	---	---	---	---	---

7. $\begin{array}{r} 38 \\ 63 \\ \hline \end{array}$	14. $\begin{array}{r} 79 \\ 39 \\ \hline \end{array}$	21. $\begin{array}{r} 36 \\ 85 \\ \hline \end{array}$	28. $\begin{array}{r} 24 \\ 72 \\ \hline \end{array}$	35. $\begin{array}{r} 24 \\ 53 \\ \hline \end{array}$	42. $\begin{array}{r} 74 \\ 69 \\ \hline \end{array}$
--	---	---	---	---	---

8. $\begin{array}{r} 73 \\ 28 \\ \hline \end{array}$	15. $\begin{array}{r} 27 \\ 86 \\ \hline \end{array}$	22. $\begin{array}{r} 89 \\ 41 \\ \hline \end{array}$	29. $\begin{array}{r} 22 \\ 49 \\ \hline \end{array}$	36. $\begin{array}{r} 19 \\ 63 \\ \hline \end{array}$	43. $\begin{array}{r} 89 \\ 79 \\ \hline \end{array}$
--	---	---	---	---	---

9. $\begin{array}{r} 56 \\ 39 \\ \hline \end{array}$	16. $\begin{array}{r} 92 \\ 48 \\ \hline \end{array}$	23. $\begin{array}{r} 49 \\ 25 \\ \hline \end{array}$	30. $\begin{array}{r} 75 \\ 17 \\ \hline \end{array}$	37. $\begin{array}{r} 71 \\ 52 \\ \hline \end{array}$	44. $\begin{array}{r} 94 \\ 41 \\ \hline \end{array}$
--	---	---	---	---	---

10. $\begin{array}{r} 68 \\ 57 \\ \hline \end{array}$	17. $\begin{array}{r} 94 \\ 27 \\ \hline \end{array}$	24. $\begin{array}{r} 85 \\ 51 \\ \hline \end{array}$	31. $\begin{array}{r} 31 \\ 73 \\ \hline \end{array}$	38. $\begin{array}{r} 58 \\ 26 \\ \hline \end{array}$	45. $\begin{array}{r} 91 \\ 78 \\ \hline \end{array}$
---	---	---	---	---	---

MULTIPLYING DOLLARS AND CENTS



1. Celia pays \$1.25 for a music lesson. Last year she had 39 lessons. How much did the lessons cost?

You multiply dollars and cents just as you multiply other numbers.

First multiply 125 by 39, which gives 4875.

$$\begin{array}{r}
 \$1.25 \\
 \times 39 \\
 \hline
 11\ 25 \\
 37\ 5 \\
 \hline
 \$48.75
 \end{array}$$

Place a decimal point before the last two figures of the answer.

The cost of the lessons was \$48.75.

Check the work by going over it again.

2. Mr. Lawrence bought 35 tickets to the circus for the girls and boys in Roderick's class. He paid 55¢ for each ticket. How much did the tickets cost in all?

Write 55¢ as \$.55. Then multiply it by 35.

Place the decimal point before the last two figures of the product.

Mr. Lawrence paid \$19.25 for the tickets.

$$\begin{array}{r}
 $.55 \\
 \times 35 \\
 \hline
 2\ 75 \\
 16\ 5 \\
 \hline
 \$19.25
 \end{array}$$

Exercises

1. If each of a club's 35 members pays 75¢ in dues, how much money will the club have?

2. Alfred pays \$2.25 an hour for his music lessons. How much does he pay for 26 hours?

WHEN WE NEED TO MULTIPLY

Check your work by going over it again.

1. How much will a shoemaker receive for repairing 13 pairs of shoes at \$1.35 a pair?

2. At 35¢ each, find the cost of 48 baseballs.

3. May has a lunch allowance of 25¢ a day. In 23 school days, what is her total allowance?

4. The school library bought 93 new books at \$1.16 each. How much did the books cost?

Practice until you can multiply and check 5 of the following examples in 8 minutes (after copying):

- | | | |
|------------------------|------------------------|------------------------|
| 5. $24 \times \$1.22$ | 19. $36 \times \$9.28$ | 33. $16 \times \$6.75$ |
| 6. $14 \times \$1.67$ | 20. $47 \times \$4.91$ | 34. $91 \times \$3.19$ |
| 7. $27 \times \$0.53$ | 21. $28 \times \$9.54$ | 35. $62 \times \$5.37$ |
| 8. $63 \times \$5.41$ | 22. $56 \times \$7.62$ | 36. $57 \times \$3.28$ |
| 9. $71 \times \$2.84$ | 23. $34 \times \$5.78$ | 37. $37 \times \$1.59$ |
| 10. $68 \times \$0.17$ | 24. $65 \times \$1.49$ | 38. $48 \times \$3.29$ |
| 11. $12 \times \$3.64$ | 25. $96 \times \$0.38$ | 39. $69 \times \$6.52$ |
| 12. $82 \times \$1.87$ | 26. $27 \times \$1.26$ | 40. $28 \times \$1.76$ |
| 13. $54 \times \$4.58$ | 27. $27 \times \$8.67$ | 41. $15 \times \$9.59$ |
| 14. $34 \times \$0.39$ | 28. $98 \times \$5.26$ | 42. $76 \times \$2.94$ |
| 15. $25 \times \$2.96$ | 29. $39 \times \$0.74$ | 43. $17 \times \$3.17$ |
| 16. $95 \times \$3.17$ | 30. $49 \times \$7.19$ | 44. $39 \times \$6.94$ |
| 17. $68 \times \$0.63$ | 31. $53 \times \$3.16$ | 45. $32 \times \$2.49$ |
| 18. $19 \times \$4.96$ | 32. $54 \times \$5.36$ | 46. $83 \times \$2.63$ |

A TEST ON THE 90 DIVISION COMBINATIONS

Your work is *excellent* if you can do all the following orally in 2 minutes ; it is *good* if you can do them in 3 minutes ; and *fair* if you can do them in 4 minutes.

Give the quotients only :

- | | | | | | |
|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 1. $2 \overline{)4}$ | $4 \overline{)28}$ | $1 \overline{)9}$ | $6 \overline{)6}$ | $1 \overline{)3}$ | $3 \overline{)18}$ |
| 2. $1 \overline{)6}$ | $3 \overline{)27}$ | $7 \overline{)28}$ | $5 \overline{)15}$ | $8 \overline{)48}$ | $5 \overline{)0}$ |
| 3. $4 \overline{)4}$ | $3 \overline{)12}$ | $6 \overline{)18}$ | $2 \overline{)12}$ | $1 \overline{)7}$ | $9 \overline{)36}$ |
| 4. $4 \overline{)0}$ | $3 \overline{)6}$ | $4 \overline{)16}$ | $5 \overline{)30}$ | $7 \overline{)14}$ | $6 \overline{)48}$ |
| 5. $3 \overline{)3}$ | $4 \overline{)20}$ | $8 \overline{)16}$ | $2 \overline{)0}$ | $5 \overline{)45}$ | $7 \overline{)35}$ |
| 6. $9 \overline{)9}$ | $6 \overline{)24}$ | $6 \overline{)42}$ | $5 \overline{)20}$ | $1 \overline{)1}$ | $3 \overline{)0}$ |
| 7. $2 \overline{)8}$ | $4 \overline{)24}$ | $4 \overline{)36}$ | $5 \overline{)5}$ | $5 \overline{)35}$ | $7 \overline{)49}$ |
| 8. $3 \overline{)9}$ | $6 \overline{)30}$ | $2 \overline{)16}$ | $9 \overline{)0}$ | $5 \overline{)25}$ | $1 \overline{)8}$ |
| 9. $4 \overline{)8}$ | $2 \overline{)2}$ | $7 \overline{)56}$ | $2 \overline{)6}$ | $8 \overline{)24}$ | $5 \overline{)40}$ |
| 10. $7 \overline{)0}$ | $9 \overline{)27}$ | $3 \overline{)24}$ | $6 \overline{)12}$ | $9 \overline{)18}$ | $8 \overline{)64}$ |
| 11. $1 \overline{)4}$ | $7 \overline{)21}$ | $3 \overline{)15}$ | $9 \overline{)54}$ | $2 \overline{)14}$ | $8 \overline{)0}$ |
| 12. $8 \overline{)8}$ | $5 \overline{)10}$ | $8 \overline{)40}$ | $9 \overline{)72}$ | $9 \overline{)63}$ | $2 \overline{)18}$ |
| 13. $6 \overline{)0}$ | $1 \overline{)2}$ | $8 \overline{)32}$ | $9 \overline{)81}$ | $4 \overline{)12}$ | $3 \overline{)21}$ |
| 14. $7 \overline{)7}$ | $8 \overline{)56}$ | $2 \overline{)10}$ | $8 \overline{)72}$ | $6 \overline{)54}$ | $7 \overline{)63}$ |
| 15. $1 \overline{)0}$ | $9 \overline{)45}$ | $1 \overline{)5}$ | $6 \overline{)36}$ | $4 \overline{)32}$ | $7 \overline{)42}$ |

A HARDER TEST IN DIVISION

For ex. 1 to 6, 2 minutes is an *excellent* record, 3 minutes is *good*, and 4 minutes is *fair*.

Give the quotients and the remainders orally:

For example, in $5 \overline{)32}$, say only "6 and 2 over."

$$1. \quad 5 \overline{)32} \quad 9 \overline{)15} \quad 4 \overline{)19} \quad 2 \overline{)13} \quad 3 \overline{)29} \quad 5 \overline{)42}$$

$$2. \quad 6 \overline{)15} \quad 3 \overline{)20} \quad 7 \overline{)25} \quad 9 \overline{)19} \quad 7 \overline{)18} \quad 3 \overline{)11}$$

$$3. \quad 9 \overline{)11} \quad 5 \overline{)29} \quad 3 \overline{)26} \quad 8 \overline{)11} \quad 6 \overline{)35} \quad 7 \overline{)37}$$

$$4. \quad 8 \overline{)19} \quad 3 \overline{)14} \quad 8 \overline{)27} \quad 4 \overline{)35} \quad 5 \overline{)24} \quad 2 \overline{)17}$$

$$5. \quad 6 \overline{)10} \quad 8 \overline{)35} \quad 9 \overline{)29} \quad 4 \overline{)22} \quad 5 \overline{)37} \quad 7 \overline{)29}$$

$$6. \quad 6 \overline{)27} \quad 4 \overline{)29} \quad 7 \overline{)27} \quad 4 \overline{)14} \quad 8 \overline{)46} \quad 6 \overline{)19}$$

For ex. 7 to 13, 3 minutes is *excellent*, 4 minutes is *good*, and 5 minutes is *fair*.

Give the results for the following orally:

$$7. \quad 8 \overline{)39} \quad 7 \overline{)48} \quad 9 \overline{)60} \quad 6 \overline{)40} \quad 7 \overline{)20} \quad 9 \overline{)49}$$

$$8. \quad 8 \overline{)21} \quad 9 \overline{)32} \quad 7 \overline{)31} \quad 6 \overline{)51} \quad 8 \overline{)77} \quad 7 \overline{)58}$$

$$9. \quad 9 \overline{)71} \quad 7 \overline{)52} \quad 6 \overline{)22} \quad 9 \overline{)38} \quad 9 \overline{)79} \quad 7 \overline{)40}$$

$$10. \quad 6 \overline{)53} \quad 8 \overline{)55} \quad 7 \overline{)45} \quad 9 \overline{)23} \quad 8 \overline{)70} \quad 9 \overline{)65}$$

$$11. \quad 9 \overline{)41} \quad 8 \overline{)49} \quad 4 \overline{)31} \quad 7 \overline{)61} \quad 8 \overline{)52} \quad 9 \overline{)87}$$

$$12. \quad 8 \overline{)61} \quad 9 \overline{)83} \quad 6 \overline{)44} \quad 7 \overline{)68} \quad 8 \overline{)31} \quad 9 \overline{)59}$$

$$13. \quad 8 \overline{)59} \quad 9 \overline{)51} \quad 8 \overline{)66} \quad 6 \overline{)57} \quad 7 \overline{)50} \quad 6 \overline{)49}$$

SOME FRACTIONS YOU NEED IN DIVISION

1. This apple is divided into 4 equal parts. What do you call 1 part? What do you call 2 parts? 3 parts? Write three fourths or three quarters like this: $\frac{3}{4}$.



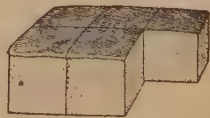
2. Mary has a stick of candy which she divides into 3 equal parts. What do you call 1 part? 2 parts? Write two thirds like this: $\frac{2}{3}$.

3. Into how many equal parts is this pie divided? What do you call 1 part? 5 parts?

Write five sixths like this: $\frac{5}{6}$.



4. The picture below shows an apple $\frac{1}{4}$ of which has been cut off. What part of the apple is left? What part of a pie is shown in the picture? what part of a cake?



5. Jack has 2 apples and half of another apple. He says it is shorter to say that he has two and a half apples. He writes it like this: $2\frac{1}{2}$ apples.

6. May has 4 oranges and three quarters of another orange. She writes it like this: $4\frac{3}{4}$ oranges.

7. *Tell what these mean and draw a picture of each:*
 $2\frac{1}{2}$ pies $6\frac{3}{4}$ apples $3\frac{3}{4}$ inches of ribbon

WRITING THE REMAINDER AS A FRACTION

1. Grandfather divided 15 apples equally between Bob and Jack. How many apples did each boy get?

When you divide 15 apples by 2, you get 7 apples, with 1 apple left over, which you have not yet divided. If you divide 1 apple between the 2 boys, each gets $\frac{1}{2}$ of it. Hence each boy got $7\frac{1}{2}$ apples.

In the answer $7\frac{1}{2}$, you see that the remainder 1 is written over the divisor.

When you have a remainder in a division problem, you can always write the remainder over the divisor, thus making a fraction in the quotient.

You now have two ways of writing the remainder:

Old Way	New Way
$\begin{array}{r} 2 \overline{)15} \\ 7 \text{ R } 1 \end{array}$	$\begin{array}{r} 2 \overline{)15} \\ 7\frac{1}{2} \end{array}$

2. Divide 11 lb. of candy equally among 4 girls.

Dividing 11 by 4, you get 2 and a remainder of 3. Writing the 3 over the divisor 4, you have $\frac{3}{4}$. Hence the quotient is $2\frac{3}{4}$.

Each girl gets $2\frac{3}{4}$ lb. of candy.

$$\begin{array}{r} 4 \overline{)11} \\ 2\frac{3}{4} \end{array}$$

Divide the following, writing the remainder over the divisor so as to make a fraction in the quotient:

3. $2 \overline{)63}$ 5. $4 \overline{)49}$ 7. $8 \overline{)75}$ 9. $3 \overline{)428}$ 11. $5 \overline{)374}$

4. $3 \overline{)47}$ 6. $5 \overline{)63}$ 8. $2 \overline{)115}$ 10. $4 \overline{)239}$ 12. $8 \overline{)137}$

PARTS OF A CENT

In the following problems, write each remainder over the divisor, making a fraction in the quotient.

1. When you buy 2 bananas for 5¢, how much does each banana cost?

2. Louise bought 3 pencils for 10¢. How much did each pencil cost?

3. Alice paid 25¢ for 2 yd. of ribbon. How much did she pay for each yard?

4. Will bought 3 marbles for 1¢. How much did each marble cost?

5. Jack paid 25¢ for 6 pads of paper. How much did each pad cost?

6. How much do you pay for 1 tennis ball if you get 3 balls for \$1.00? 2 balls for 75¢? 2 balls for \$1.25? 4 balls for \$1.75?

Divide the following, writing the remainder over the divisor in the form of a fraction:

7. $2\overline{)775}$ 12. $5\overline{)398}$ 17. $6\overline{)893}$ 22. $5\overline{)\$2.34}$

8. $3\overline{)230}$ 13. $7\overline{)593}$ 18. $4\overline{)381}$ 23. $4\overline{)\$9.47}$

9. $6\overline{)355}$ 14. $2\overline{)519}$ 19. $3\overline{)895}$ 24. $7\overline{)\$4.14}$

10. $8\overline{)945}$ 15. $9\overline{)652}$ 20. $9\overline{)352}$ 25. $8\overline{)\$3.81}$

11. $4\overline{)751}$ 16. $8\overline{)475}$ 21. $7\overline{)745}$ 26. $6\overline{)\$7.81}$

HOW TO FIND AVERAGES

1. John sold magazines in his neighborhood. He sold 55 magazines the first week, 60 magazines the second week, and 65 magazines the third week. Hence he sold 180 magazines in 3 weeks.

To sell 180 magazines in 3 weeks is the same as to sell 60 magazines each week for 3 weeks. We may say that John sold an *average* of 60 magazines a week.

The third week John sold 5 more than 60 magazines, which made up for the first week when he sold 5 less than 60 magazines.

To find the *average* quickly, add the 3 numbers, 55, 60, and 65, which gives 180. Then divide 180 by 3. This gives 60 as the average number of magazines John sold in a week.

$$\begin{array}{r} 55 \\ 60 \\ 65 \\ \hline 3 \overline{)180} \text{ Sum} \\ 60 \text{ Average} \end{array}$$

2. Last week Edgar worked 4 days. He worked 7 hr. on Monday, 6 hr. on Tuesday, 4 hr. on Thursday, and 6 hr. on Friday. Find the average number of hours a day he worked.

Add the 4 numbers and divide their sum by 4. The quotient, $5\frac{3}{4}$, means that Edgar worked an *average* of $5\frac{3}{4}$ hours a day. You divide by 4 because 4 numbers were added.

$$\begin{array}{r} 7 \\ 6 \\ 4 \\ 6 \\ \hline 4 \overline{)23} \\ 5\frac{3}{4} \end{array}$$

3. Helen earned \$1.35 in 5 days. What was the average amount she earned in a day?

Here there are no numbers to add because you are told that the sum is \$1.35. Divide \$1.35 by 5 to find the average earnings.

FINDING AVERAGES

1. Mary had a popcorn stand at the county fair. On Monday she sold 72 bags of popcorn ; on Tuesday, 48 bags ; on Wednesday, 93 bags ; on Thursday, 52 bags ; and on Friday, 65 bags. How many bags did she sell, on an average, in a day ?

2. Some boy scouts went on a 4-day hike. David kept a record of the number of miles they walked each day : Monday, 14 miles ; Tuesday, 17 miles ; Wednesday, 16 miles ; and Thursday, 16 miles. What was the average distance they walked in a day ?

3. Kate buys her lunch at school. Last week she spent 85¢ for lunches on the 5 school days. How much, on an average, did she spend per day ?

4. Our class has 38 pupils. Last week 32 pupils were present on Monday, 37 on Tuesday, 38 on Wednesday, 33 on Thursday, and 35 on Friday. What was the average daily attendance last week ?

5. Nat drove 895 miles in 4 days to visit a friend. Find the average distance he drove each day.

6. Four boys have just weighed themselves. Frank weighs 56 lb. ; Jim, 64 lb. ; Fred, 54 lb. ; and Ned, 61 lb. Find their average weight.

7. Here are the heights of 8 children in Fred's class : Mary, 47 in. ; Fred, 49 in. ; Joe, 53 in. ; Sue, 48 in. ; Jack, 51 in. ; Lulu, 49 in. ; Ida, 52 in. ; Tom, 54 in. Find their average height.

IMPROVING OUR SCHOOL RECORDS

1. In October Alice's mark in arithmetic was 86 ; in November, 82 ; in December, 90. What was her average mark for these 3 months?

2. Alice's arithmetic mark for January was 91 ; for February, 94 ; for March, 85. What was her average for these 3 months? Was it better than for the first 3 months?

3. Find Alice's average for the 6 months.

4. Jennie's marks in arithmetic were 89 for October, 83 for November, and 89 for December. What was her average for the 3 months?

5. Jennie's marks in arithmetic were 96 for January, 93 for February, and 96 for March. What was her average for these 3 months?

6. Find Jennie's average for the 6 months. Did Jennie or Alice do better for the 6 months?

7. Tom's report card for October gave him these marks : Arithmetic, 90 ; Geography, 84 ; History, 82 ; Language, 79 ; Reading, 88 ; Spelling, 94. What was his average mark in all his studies in October?

8. Will received these marks for October : Arithmetic, 70 ; Geography, 76 ; History, 71 ; Language, 70 ; Reading, 80 ; Spelling, 83. What was his average mark in all his studies for October?

9. If Will had received 94 in arithmetic, instead of 70, what would his average have been?

LEARNING LONG DIVISION

When you divide by a number of two or more figures, you must use **long division**. In long division all the steps are written down, while in short division much of the work is done mentally.

Divide 275 by 11, using long division.

Write the divisor at the left of 275 and draw a line over 275. In long division it is more convenient to write the quotient above the dividend.

25	Quotient
Divisor 11	Dividend
$\overline{11)275}$	
22	
$\underline{22}$	
55	
$\underline{55}$	
	<i>Check</i>
	25
	<u>11</u>
	25
	<u>25</u>
	275

1. First divide 27 by 11, thinking "How many 11's are there in 27?" 27 is called the *partial dividend*. Since there are two 11's in 27, write 2 over 7, which is the last figure of 27.

2. Think " $2 \times 11 = 22$." Write 22 under 27.

3. Subtract 22 from 27. The remainder is 5.

4. Compare the remainder, 5, with the divisor, 11. *The remainder must always be smaller than the divisor.*

5. Bring down the next figure of 275, which is 5. Write it after the remainder 5, making 55.

Repeat these five steps for the next quotient figure:

1. Think " $55 \div 11 = 5$." Write 5 in the quotient.

2. Think " $5 \times 11 = 55$." Write 55 under 55.

3. Think " $55 - 55 = 0$."

4. Think "0 is less than 11, hence 5 is right."

5. There is no other figure to bring down from the dividend, hence the work is finished. The quotient is 25.

Check by multiplying 25 by 11, as shown above. Since the product, 275, is the same as the dividend, the work is right.

THE FIVE STEPS IN LONG DIVISION

In long division the following five steps are necessary in finding each figure of the quotient:

1. *Divide* the partial dividend by the divisor. Write the first figure of the quotient over the last figure of the partial dividend.

2. *Multiply* the divisor by the quotient figure.

3. *Subtract*.

4. *Compare* the remainder and the divisor before you bring down the next figure. *The remainder should always be less than the divisor.*

5. *Bring down* the next figure of the dividend.

Remember the five steps thus: (1) Divide, (2) Multiply, (3) Subtract, (4) Compare, (5) Bring down.

Exercises in Long Division

Divide by 11, using long division. Check:

- | | | | | |
|--------|--------|----------|----------|----------|
| 1. 253 | 5. 495 | 9. 3564 | 13. 6116 | 17. 2893 |
| 2. 374 | 6. 396 | 10. 1991 | 14. 2629 | 18. 5115 |
| 3. 473 | 7. 187 | 11. 4631 | 15. 4818 | 19. 9141 |
| 4. 242 | 8. 451 | 12. 7117 | 16. 3839 | 20. 4191 |

Divide by 12, using long division. Check:

- | | | | | |
|---------|---------|----------|----------|----------|
| 21. 372 | 25. 768 | 29. 5316 | 33. 3972 | 37. 5196 |
| 22. 156 | 26. 684 | 30. 4488 | 34. 3192 | 38. 4764 |
| 23. 384 | 27. 528 | 31. 3864 | 35. 4968 | 39. 1476 |
| 24. 540 | 28. 996 | 32. 8724 | 36. 4296 | 40. 4428 |

ARRANGING CHAIRS IN ROWS



1. Jack is arranging seats for the school play. He puts 20 chairs in a row. How many rows do 85 chairs make? How many 20's are there in 85? Does Jack have any chairs left over?

To find how many rows of 20 chairs each Jack can make with 85 chairs, think " $8 \div 2 = 4$."

To find how many chairs are left over, think " $4 \times 20 = 80$; $85 - 80 = 5$."

There are 4 rows, and 5 chairs are left over.

The number left over must be less than 20, because if 20 chairs or more were left over, they would make another row.

$$\begin{array}{r} 4 \\ 20 \overline{)85} \\ \underline{80} \\ 5 \end{array}$$

2. Suppose that Jack puts 21 chairs in each row. How many rows will 85 chairs make?

Since 21 almost equals 20, there are about as many 21's in 85 as there are 20's. Hence, to divide 85 by 21, think " $8 \div 2 = 4$." Then $85 \div 21$ is probably 4.

$$\begin{array}{r} 4 \leftarrow \\ 21 \overline{)85} \\ \underline{84} \\ 1 \leftarrow \end{array} \quad \begin{array}{|l} 4 \text{ is right} \\ \text{because} \\ 1 \text{ is less} \\ \text{than 21.} \end{array}$$

To find how many chairs are left over, think " $4 \times 21 = 84$; $85 - 84 = 1$." Since this remainder, 1, is less than 21, the quotient 4 is right.

There will be 4 rows of chairs, and 1 chair will be left over.

3. How many rows do 66 chairs make if 21 chairs are put in each row? How many chairs are left over?

DIVIDING BY 21

Mr. Lodge has \$6804, which he wishes to divide equally among 21 boys and girls to help them go to college. How much will each one receive?

Divide 6804 by 21 in this way:

1. The first partial dividend is 68. Divide 68 by 21, thinking " $6 \div 2 = 3$." Write 3 in the quotient over 8.

2. $3 \times 21 = 63$. Write 63 under 68.

3. Subtract 63 from 68. This leaves 5.

4. Compare the remainder, 5, with the divisor, 21. Is the remainder less than the divisor?

5. Bring down 0 and write it after 5, making 50.

$$\begin{array}{r}
 324 \\
 21 \overline{)6804} \\
 \underline{63} \\
 50 \\
 \underline{42} \\
 84 \\
 \underline{84} \\
 \text{Check} \\
 324 \\
 \underline{21} \\
 324 \\
 \underline{648} \\
 6804
 \end{array}$$

Now repeat these five steps for the second quotient figure. First divide 50 by 21, thinking " $5 \div 2$ gives 2." Write 2 in the quotient. What are the other four steps? How do you find the third quotient figure?

Each boy and girl will get \$324. Check by multiplying.

When the divisor is 21, divide by 2 to estimate the quotient figure.

Exercises

Divide each number by 21 and check the work:

- | | | | | |
|--------|---------|----------|---------|----------|
| 1. 693 | 5. 1071 | 9. 4473 | 13. 504 | 17. 9072 |
| 2. 483 | 6. 1491 | 10. 4893 | 14. 525 | 18. 7203 |
| 3. 462 | 7. 1092 | 11. 8988 | 15. 714 | 19. 5124 |
| 4. 882 | 8. 1281 | 12. 8904 | 16. 945 | 20. 5061 |

SHARING STAMPS

George has 1376 stamps. If he divides them equally among the 32 boys in his class, how many stamps will each boy receive?

You cannot divide 13 by 32, hence use 137 as the partial dividend.

$$\begin{array}{r} 43 \\ 32 \overline{)1376} \\ \underline{128} \\ 96 \\ \underline{96} \\ 0 \end{array}$$

1. To divide 137 by 32, think "How many 3's are there in 13?" Since there are 4 3's in 13, write 4 over 7, which is the last figure of 137.

2. Think " $4 \times 32 = 128$." Write 128 under 137.

3. Show how to complete the work and check it.

Exercises

1. Alice divided 483 stamps equally among 23 girls. How many stamps did each girl receive?

Divide, and check the work. When the divisor is 21, 22, or 23, divide by 2 to estimate the quotient figure. When the divisor is 31, 32, or 33, divide by 3:

- | | | |
|-------------------|--------------------|--------------------|
| 2. $682 \div 22$ | 11. $1302 \div 21$ | 20. $961 \div 31$ |
| 3. $462 \div 22$ | 12. $1743 \div 21$ | 21. $651 \div 31$ |
| 4. $484 \div 22$ | 13. $1155 \div 21$ | 22. $896 \div 32$ |
| 5. $726 \div 22$ | 14. $1974 \div 21$ | 23. $800 \div 32$ |
| 6. $924 \div 22$ | 15. $1512 \div 21$ | 24. $693 \div 33$ |
| 7. $506 \div 23$ | 16. $8673 \div 21$ | 25. $792 \div 33$ |
| 8. $782 \div 23$ | 17. $1166 \div 22$ | 26. $1457 \div 31$ |
| 9. $966 \div 23$ | 18. $1364 \div 22$ | 27. $7471 \div 31$ |
| 10. $672 \div 21$ | 19. $1584 \div 22$ | 28. $6972 \div 21$ |

DIVISORS ENDING IN 1, 2, 3, 4, OR 5

When a two-figure divisor ends in 1, 2, 3, 4, or 5, divide by the first figure of the divisor to estimate each figure of the quotient.

Thus, if the divisor is 41, 42, 43, 44, or 45, divide by 4 to estimate the quotient figure. If the divisor is 31, 32, 33, 34, or 35, divide by 3.

By what number should you divide if the divisor is 62? 73?

Divide the following and check the work:

- | | | |
|-------------------|--------------------|--------------------|
| 1. $567 \div 21$ | 18. $1891 \div 31$ | 35. $5766 \div 93$ |
| 2. $651 \div 21$ | 19. $1763 \div 41$ | 36. $4277 \div 91$ |
| 3. $992 \div 31$ | 20. $1271 \div 41$ | 37. $5576 \div 41$ |
| 4. $806 \div 31$ | 21. $1071 \div 51$ | 38. $6273 \div 51$ |
| 5. $861 \div 41$ | 22. $1281 \div 61$ | 39. $8946 \div 71$ |
| 6. $984 \div 41$ | 23. $1491 \div 71$ | 40. $9492 \div 42$ |
| 7. $533 \div 41$ | 24. $1701 \div 81$ | 41. $5876 \div 52$ |
| 8. $816 \div 51$ | 25. $1696 \div 32$ | 42. $9512 \div 82$ |
| 9. $765 \div 51$ | 26. $2730 \div 42$ | 43. $9675 \div 43$ |
| 10. $732 \div 61$ | 27. $5589 \div 81$ | 44. $6466 \div 53$ |
| 11. $854 \div 61$ | 28. $2652 \div 52$ | 45. $1768 \div 34$ |
| 12. $923 \div 71$ | 29. $4526 \div 62$ | 46. $2376 \div 44$ |
| 13. $994 \div 71$ | 30. $3096 \div 72$ | 47. $2688 \div 64$ |
| 14. $972 \div 81$ | 31. $1452 \div 33$ | 48. $6696 \div 54$ |
| 15. $891 \div 81$ | 32. $2279 \div 43$ | 49. $1155 \div 35$ |
| 16. $819 \div 91$ | 33. $4032 \div 63$ | 50. $2790 \div 45$ |
| 17. $512 \div 32$ | 34. $5183 \div 73$ | 51. $5775 \div 25$ |

AUTOMOBILE PROBLEMS

1. Mr. Knowlton drives his car at an average of 21 miles an hour. How many hours will it take him to drive 273 miles? How many 21's are there in 273?

2. Jack's father averages 24 miles an hour in his car. How many hours will it take him to make a trip of 288 miles?

3. Mr. Brown drove his car 575 miles in 25 hours. How many miles per hour did he average?

4. Mr. Thomas used 23 gallons of gasoline on a trip of 506 miles. How many miles per gallon did he average?

5. Mr. Cook used 32 gallons of gasoline on a trip of 544 miles. How many miles per gallon did he average? Did he do as well as Mr. Thomas?

Divide the following and check the work:

- | | | |
|--------------------|----------------------|----------------------|
| 6. $2747 \div 41$ | 16. $26,424 \div 72$ | 26. $37,064 \div 82$ |
| 7. $3392 \div 53$ | 17. $26,979 \div 51$ | 27. $19,932 \div 44$ |
| 8. $6768 \div 72$ | 18. $16,836 \div 92$ | 28. $39,744 \div 54$ |
| 9. $5063 \div 83$ | 19. $52,033 \div 61$ | 29. $31,450 \div 74$ |
| 10. $3384 \div 24$ | 20. $26,796 \div 84$ | 30. $89,582 \div 94$ |
| 11. $9664 \div 64$ | 21. $55,876 \div 61$ | 31. $17,990 \div 35$ |
| 12. $9990 \div 74$ | 22. $38,016 \div 72$ | 32. $62,560 \div 85$ |
| 13. $8155 \div 35$ | 23. $22,540 \div 92$ | 33. $18,260 \div 55$ |
| 14. $7810 \div 55$ | 24. $29,736 \div 63$ | 34. $18,975 \div 75$ |
| 15. $9225 \div 75$ | 25. $66,309 \div 93$ | 35. $44,030 \div 85$ |

DIVIDING DOLLARS AND CENTS

It cost Mr. Hill \$425.88 to run his automobile for a whole year. Find the average cost per week.

Since there are 52 weeks in a year, you divide \$425.88 by 52.

Divide dollars and cents in long division just as you divide any other numbers. Dividing 42588 by 52, you get 819. Place the decimal point in the quotient above the decimal point in the dividend. This gives \$8.19 as the quotient.

$$\begin{array}{r}
 \$8.19 \\
 52 \overline{) \$425.88} \\
 \underline{416} \\
 98 \\
 \underline{52} \\
 468 \\
 \underline{468} \\
 0
 \end{array}$$

The average cost per week was \$8.19.

Check by multiplying \$8.19 by 52.

Exercises

1. A boat club is spending \$204.75 for a second-hand motor boat. If 65 members share the expense equally, how much must each member pay?

2. A gas bill for July and August, 62 days, was \$13.02. How much, on the average, was the bill for a day?

Divide the following and check the work:

- | | | |
|------------------|-------------------|------------------|
| 3. \$426.87 ÷ 51 | 9. \$140.28 ÷ 42 | 15. \$13.25 ÷ 53 |
| 4. \$128.73 ÷ 21 | 10. \$197.16 ÷ 62 | 16. \$29.70 ÷ 55 |
| 5. \$156.64 ÷ 22 | 11. \$354.41 ÷ 83 | 17. \$53.25 ÷ 75 |
| 6. \$119.83 ÷ 23 | 12. \$301.49 ÷ 73 | 18. \$88.35 ÷ 95 |
| 7. \$667.74 ÷ 93 | 13. \$466.70 ÷ 65 | 19. \$31.24 ÷ 44 |
| 8. \$109.72 ÷ 52 | 14. \$468.65 ÷ 65 | 20. \$55.44 ÷ 84 |

REMAINDERS IN LONG DIVISION

Wilfred buys a stamp book for his 1797 stamps. If he pastes 35 stamps on each page, how many pages of the book will he fill?

$$\begin{array}{r}
 51 \\
 35 \overline{) 1797} \\
 \underline{175} \\
 47 \\
 \underline{35} \\
 R \ 12
 \end{array}$$

Dividing 1797 by 35, you get 51 as a quotient. There is a remainder of 12, which may be marked *R*. The quotient may also be written $51\frac{12}{35}$.

The stamps fill 51 pages, and 12 stamps are left over.

In checking, first multiply the quotient by the divisor, thus: $35 \times 51 = 1785$. Then add the remainder, 12, to 1785, which gives 1797. Since 1797 is the same as the dividend, the work is right.

Check

$$\begin{array}{r}
 51 \text{ Quotient} \\
 35 \text{ Divisor} \\
 \hline
 255 \\
 153 \\
 \hline
 1785 \\
 12 \text{ Remainder} \\
 \hline
 1797 \text{ Dividend}
 \end{array}$$

Exercises

1. Doris is stringing beads. She has 900 beads, and she puts 62 beads on each string. How many strings can she make? How many beads will be left over?

Divide and check. Write R before each remainder:

- | | | |
|-------------------|--------------------|-----------------------|
| 2. $1911 \div 21$ | 8. $2052 \div 33$ | 14. $\$47.93 \div 84$ |
| 3. $6836 \div 21$ | 9. $9961 \div 43$ | 15. $\$59.60 \div 41$ |
| 4. $6293 \div 73$ | 10. $3330 \div 74$ | 16. $\$11.95 \div 22$ |
| 5. $5719 \div 42$ | 11. $7949 \div 81$ | 17. $\$69.57 \div 32$ |
| 6. $2410 \div 52$ | 12. $1798 \div 35$ | 18. $\$79.92 \div 72$ |
| 7. $8879 \div 72$ | 13. $4768 \div 91$ | 19. $\$19.35 \div 55$ |

WATCHING ZEROS IN LONG DIVISION

1. Mr. Lacy bought a bungalow for \$5750. He agreed to pay for it in 23 months, paying the same amount each month. How much was he to pay each month?

Find the first two figures of the quotient in the usual manner.

$$\begin{array}{r} 250 \\ 23 \overline{)5750} \\ \underline{46} \\ 115 \\ \underline{115} \\ 0 \\ 0 \end{array}$$

When you subtract 115 from 115, you have no remainder. In other problems the work was finished when there was no remainder; but in this case there is a 0 in the dividend, which has not yet been brought down. Bring down the 0. Then divide 0 by 23, which equals 0, because 0 divided by any number equals 0. Write 0 in the quotient. Think " $0 \times 23 = 0$." Subtract 0 from 0, which leaves no remainder. Now the work is finished.

The quotient is 250.

Mr. Lacy was to pay \$250 a month on his bungalow.

Check by finding 23×250 .

2. Divide 19,215 by 63.

The first quotient figure is 3. Subtract 189 from 192, which leaves 3.

Bring down 1, making 31.

$$\begin{array}{r} 305 \\ 63 \overline{)19215} \\ \underline{189} \\ 315 \\ \underline{315} \end{array}$$

You see that 63 is contained no times in 31, because 31 is less than 63; hence you write 0 in the quotient.

Bring down 5 and write it after 31, making 315.

Think " $31 \div 6$ gives 5." Write 5 in the quotient. Since $5 \times 63 = 315$, the work is finished.

The quotient is 305.

Check by finding 63×305 . Does the result equal the dividend?

PROBLEMS IN LONG DIVISION



1. A tall building in a large city is 680 ft. high. This is how many times as high as a schoolhouse 34 ft. high?

2. It cost Mr. Lee \$42,068 to run his factory for 52 wk. What was the average cost per week?

3. Albert traveled a distance of 1050 miles in a fast train in 21 hours. On an average, how many miles an hour did the train go?

4. A coal company collected \$2626 in January selling coal at \$13 a ton. How many tons were sold?

5. If 2415 tulip bulbs were planted in 23 equal rows, how many bulbs were put in each row?

Divide the following and check the work:

- | | | |
|----------------------|----------------------|-----------------------|
| 6. $21,252 \div 42$ | 15. $18,396 \div 42$ | 24. $\$67.78 \div 22$ |
| 7. $30,660 \div 73$ | 16. $56,776 \div 94$ | 25. $\$78.00 \div 52$ |
| 8. $55,266 \div 61$ | 17. $51,538 \div 73$ | 26. $\$93.00 \div 62$ |
| 9. $50,381 \div 83$ | 18. $10,400 \div 65$ | 27. $\$88.58 \div 43$ |
| 10. $36,654 \div 72$ | 19. $18,798 \div 61$ | 28. $\$73.40 \div 43$ |
| 11. $43,848 \div 72$ | 20. $69,720 \div 83$ | 29. $\$73.13 \div 71$ |
| 12. $38,038 \div 91$ | 21. $15,574 \div 21$ | 30. $\$76.75 \div 25$ |
| 13. $69,720 \div 83$ | 22. $16,096 \div 32$ | 31. $\$86.80 \div 62$ |
| 14. $38,656 \div 64$ | 23. $66,430 \div 91$ | 32. $\$64.81 \div 31$ |

AMY HAS TROUBLE IN FINDING THE QUOTIENT

1. Amy wants to divide 104 by 23. She thinks " $10 \div 2 = 5$. $5 \times 23 = 115$." Since 115 is larger than 104, she can not subtract 115 from 104; hence 5 is too large as quotient.

Wrong Quotient

$$\begin{array}{r} 5 \leftarrow \\ 23 \overline{)104} \\ \underline{115} \end{array}$$

5 is too large because 115 is larger than 104. Try 4.

2. Amy then tries 4 as quotient. Multiplying 23 by 4, she gets 92. Subtracting 92 from 104, she gets 12 as a remainder. Since 12 is less than the divisor, 23, 4 is the right quotient.

Right Quotient

$$\begin{array}{r} 4 \leftarrow \\ 23 \overline{)104} \\ \underline{92} \\ 12 \leftarrow \end{array}$$

4 is right because 12 is less than 23.

When the quotient figure is too large, try the next smaller figure. When the quotient figure is right, the remainder is smaller than the divisor.

Exercises

Divide, using the rule on page 37. If the quotient figure is too large, try the next smaller number:

1. $23 \overline{)164}$ 3. $22 \overline{)191}$ 5. $84 \overline{)320}$ 7. $41 \overline{)361}$

2. $32 \overline{)281}$ 4. $53 \overline{)410}$ 6. $75 \overline{)215}$ 8. $62 \overline{)304}$

NOTE. In all the exercises on pages 35 to 42, the rule on page 37 immediately gives the correct quotient figure. On pages 43 to 45, it sometimes gives a quotient figure 1 too great.

HOW MUCH DID EACH PAIR OF BOOTS COST?

Mr. Allen has a shoe store. He paid \$125.28 for 24 pairs of rubber boots. How much did each pair cost?

To get the first quotient figure, think " $12 \div 2 = 6$." You find that 6 is too large because $6 \times 24 = 144$ and 144 cannot be subtracted from 125. Hence try 5 as the quotient. 5 is right because it gives a remainder which is less than the divisor, 24.

Show how each of the other quotient figures is found.

Mr. Allen paid \$5.22 for each pair of rubber boots.

Check by multiplying \$5.22 by 24.

$$\begin{array}{r}
 \$5.22 \\
 24 \overline{) \$125.28} \\
 \underline{120} \\
 52 \\
 \underline{48} \\
 48 \\
 \underline{48} \\
 00
 \end{array}$$

Exercises

1. Mr. Allen also bought 24 pairs of boys' rubber boots for \$91.92. How much did each pair cost?

Divide the following and check the work:

- | | | |
|-------------------|--------------------|--------------------|
| 2. $817 \div 43$ | 11. $1216 \div 64$ | 20. $9021 \div 31$ |
| 3. $814 \div 22$ | 12. $6552 \div 84$ | 21. $8448 \div 44$ |
| 4. $609 \div 21$ | 13. $1045 \div 55$ | 22. $9858 \div 53$ |
| 5. $836 \div 44$ | 14. $1218 \div 42$ | 23. $8745 \div 55$ |
| 6. $924 \div 33$ | 15. $2035 \div 55$ | 24. $9072 \div 24$ |
| 7. $928 \div 32$ | 16. $2436 \div 42$ | 25. $6408 \div 24$ |
| 8. $957 \div 33$ | 17. $8170 \div 95$ | 26. $7238 \div 94$ |
| 9. $918 \div 34$ | 18. $9834 \div 33$ | 27. $9431 \div 25$ |
| 10. $600 \div 25$ | 19. $8084 \div 43$ | 28. $8289 \div 24$ |

PROBLEMS

1. Mr. Boden got 816 qt. of berries from his farm. If 24 qt. fill a crate, how many crates of berries did Mr. Boden have?

2. Last summer 22 children helped in Mrs. Ray's garden. They earned \$87.34. If they divided this equally, how much did each child get?

3. There are 45 children on a picnic. If 200 pieces of candy are divided equally among them, how many pieces will each child have? Will any candy be left?

4. Frank's teacher has 250 marbles. If he divides them equally among the 34 boys in the class, how many marbles will each boy get? How many will be left over?

Divide and check. Write R before each remainder:

- | | | |
|--------------------|--------------------|------------------------|
| 5. $638 \div 22$ | 15. $5106 \div 74$ | 25. $\$288.61 \div 73$ |
| 6. $824 \div 43$ | 16. $9025 \div 33$ | 26. $\$152.64 \div 53$ |
| 7. $928 \div 33$ | 17. $8712 \div 24$ | 27. $\$100.28 \div 23$ |
| 8. $829 \div 23$ | 18. $2465 \div 85$ | 28. $\$403.38 \div 83$ |
| 9. $855 \div 45$ | 19. $3276 \div 84$ | 29. $\$355.10 \div 53$ |
| 10. $6090 \div 21$ | 20. $8127 \div 43$ | 30. $\$184.14 \div 62$ |
| 11. $5644 \div 83$ | 21. $6730 \div 23$ | 31. $\$163.40 \div 43$ |
| 12. $7358 \div 93$ | 22. $8000 \div 23$ | 32. $\$246.67 \div 43$ |
| 13. $2633 \div 53$ | 23. $4510 \div 92$ | 33. $\$169.85 \div 43$ |
| 14. $3717 \div 63$ | 24. $4248 \div 64$ | 34. $\$163.20 \div 34$ |

REVIEW OF ADDITION

Add the following and check the work:

1. 7	2. 5	3. 9	4. 4	5. 8	6. 8	7. 9
5	4	0	7	7	7	0
0	0	7	5	6	7	5
3	2	4	4	8	5	6
6	8	7	8	5	9	8
2	9	8	8	5	9	3
8. 4	9. 7	10. 2	11. 3	12. 5	13. 6	14. 4
2	3	4	4	5	2	6
6	8	8	2	6	2	3
0	6	3	6	2	7	4
2	9	7	0	0	3	5
8	0	4	9	4	4	6
5	3	7	9	8	9	9
9	7	1	5	6	1	7

Add without copying. Practice until you can do and check 5 of these examples correctly in 8 minutes:

15. 116	16. 158	17. 180	18. 341	19. 107
762	861	259	524	746
928	577	821	862	376
514	860	157	348	952
363	321	912	657	979
210	416	596	879	219
20. 869	21. 938	22. 914	23. 864	24. 396
475	673	160	528	609
952	305	353	333	795
340	228	441	187	164
764	374	101	800	535
509	714	996	475	251

REVIEW OF SUBTRACTION

Subtract without copying. Practice until you can do and check 10 of these examples correctly in 5 minutes:

1. $\begin{array}{r} 919 \\ 520 \\ \hline \end{array}$	2. $\begin{array}{r} 750 \\ 152 \\ \hline \end{array}$	3. $\begin{array}{r} 730 \\ 540 \\ \hline \end{array}$	4. $\begin{array}{r} 800 \\ 388 \\ \hline \end{array}$	5. $\begin{array}{r} 694 \\ 397 \\ \hline \end{array}$
6. $\begin{array}{r} 462 \\ 174 \\ \hline \end{array}$	7. $\begin{array}{r} 967 \\ 771 \\ \hline \end{array}$	8. $\begin{array}{r} 957 \\ 699 \\ \hline \end{array}$	9. $\begin{array}{r} 749 \\ 281 \\ \hline \end{array}$	10. $\begin{array}{r} 664 \\ 591 \\ \hline \end{array}$
11. $\begin{array}{r} 741 \\ 666 \\ \hline \end{array}$	12. $\begin{array}{r} 840 \\ 576 \\ \hline \end{array}$	13. $\begin{array}{r} 636 \\ 468 \\ \hline \end{array}$	14. $\begin{array}{r} 682 \\ 463 \\ \hline \end{array}$	15. $\begin{array}{r} 858 \\ 280 \\ \hline \end{array}$
16. $\begin{array}{r} 444 \\ 356 \\ \hline \end{array}$	17. $\begin{array}{r} 843 \\ 498 \\ \hline \end{array}$	18. $\begin{array}{r} 811 \\ 753 \\ \hline \end{array}$	19. $\begin{array}{r} 962 \\ 505 \\ \hline \end{array}$	20. $\begin{array}{r} 721 \\ 378 \\ \hline \end{array}$

Subtract without copying. Practice until you can do and check 10 of these examples correctly in 7 minutes:

21. $\begin{array}{r} 6010 \\ 1750 \\ \hline \end{array}$	22. $\begin{array}{r} 5911 \\ 2149 \\ \hline \end{array}$	23. $\begin{array}{r} 8828 \\ 2049 \\ \hline \end{array}$	24. $\begin{array}{r} 9000 \\ 3241 \\ \hline \end{array}$
25. $\begin{array}{r} 5129 \\ 2989 \\ \hline \end{array}$	26. $\begin{array}{r} 4580 \\ 2940 \\ \hline \end{array}$	27. $\begin{array}{r} 9362 \\ 6069 \\ \hline \end{array}$	28. $\begin{array}{r} 7000 \\ 733 \\ \hline \end{array}$
29. $\begin{array}{r} 7541 \\ 1762 \\ \hline \end{array}$	30. $\begin{array}{r} 2804 \\ 953 \\ \hline \end{array}$	31. $\begin{array}{r} 7264 \\ 1085 \\ \hline \end{array}$	32. $\begin{array}{r} 9414 \\ 54 \\ \hline \end{array}$
33. $\begin{array}{r} 8700 \\ 3182 \\ \hline \end{array}$	34. $\begin{array}{r} 7433 \\ 1074 \\ \hline \end{array}$	35. $\begin{array}{r} 6724 \\ 779 \\ \hline \end{array}$	36. $\begin{array}{r} 6351 \\ 3920 \\ \hline \end{array}$
37. $\begin{array}{r} 8625 \\ 2078 \\ \hline \end{array}$	38. $\begin{array}{r} 6200 \\ 5143 \\ \hline \end{array}$	39. $\begin{array}{r} 8765 \\ 987 \\ \hline \end{array}$	40. $\begin{array}{r} 6720 \\ 845 \\ \hline \end{array}$

MULTIPLYING BY A THREE-FIGURE NUMBER

Last year Mr. Hart worked 257 days, at \$7.50 a day. How much money did he earn last year?

Multiply \$7.50 by 257 like this:

Multiply 750 by 7, which gives 5250. Write 5250 under the line.

Multiply 750 by 5, which gives 3750. Write 3750 so that the 0 comes under the 5 by which you multiplied.

Multiply 750 by 2. Write the 1500 so that the right-hand 0 comes under the 2 by which you multiplied.

\$7.50		
2 57		
<u>52 50</u>	}	Partial products
375 0		
<u>1500</u>		
<u>\$1927.50</u>		

Add the partial products and place the decimal point before the last two figures of the answer.

You see that Mr. Hart earned \$1927.50 last year.

How do you check the work?

Exercises

Multiply. Check the work by going over it again:

- | | | | | |
|---|--|---|---|---|
| 1. $\begin{array}{r} \$6.12 \\ 234 \\ \hline \end{array}$ | 5. $\begin{array}{r} 439 \\ 354 \\ \hline \end{array}$ | 9. $\begin{array}{r} 658 \\ 475 \\ \hline \end{array}$ | 13. $\begin{array}{r} 159 \\ 186 \\ \hline \end{array}$ | 17. $\begin{array}{r} 478 \\ 723 \\ \hline \end{array}$ |
| 2. $\begin{array}{r} \$1.43 \\ 112 \\ \hline \end{array}$ | 6. $\begin{array}{r} 237 \\ 857 \\ \hline \end{array}$ | 10. $\begin{array}{r} 348 \\ 926 \\ \hline \end{array}$ | 14. $\begin{array}{r} 314 \\ 567 \\ \hline \end{array}$ | 18. $\begin{array}{r} 975 \\ 642 \\ \hline \end{array}$ |
| 3. $\begin{array}{r} \$7.62 \\ 361 \\ \hline \end{array}$ | 7. $\begin{array}{r} 364 \\ 189 \\ \hline \end{array}$ | 11. $\begin{array}{r} 295 \\ 379 \\ \hline \end{array}$ | 15. $\begin{array}{r} 758 \\ 198 \\ \hline \end{array}$ | 19. $\begin{array}{r} 658 \\ 385 \\ \hline \end{array}$ |
| 4. $\begin{array}{r} \$3.69 \\ 417 \\ \hline \end{array}$ | 8. $\begin{array}{r} 294 \\ 278 \\ \hline \end{array}$ | 12. $\begin{array}{r} 629 \\ 569 \\ \hline \end{array}$ | 16. $\begin{array}{r} 267 \\ 394 \\ \hline \end{array}$ | 20. $\begin{array}{r} 815 \\ 756 \\ \hline \end{array}$ |

A NEW WAY TO CHECK MULTIPLICATION

1. Here is a new check for multiplication :

Paul multiplies 326 by 213 and gets 69,438 as the product, as shown in *A*. To check the work, he multiplies 213 by 326, as shown in *B*. Since he gets the same answer as before, he considers his work right.

If the work is correct, both products are always alike, because $213 \times 326 = 326 \times 213$, just as $6 \times 9 = 9 \times 6$.

2. You can use this method to check other problems in multiplication, as shown at the right.

3. Work examples 32 to 45 at the bottom of page 21 again and check each of them in this new way.

4. Work examples 5 to 20 on page 48 again and check each of them in the new way.

Multiply. Check the work in the new way:

5. 745	6. 123	7. 184	8. 635	9. 374
25	15	27	34	68

<i>A</i>	<i>B</i>
<i>Problem</i>	<i>Check</i>
326	213
213	326
978	1278
326	426
652	639
69438	69438

<i>Problem</i>	<i>Check</i>
122	98
98	122
976	196
1098	196
11956	98
	11956

NOTE. Problems having one-figure multipliers, like 9×125 , should be checked by going over the work again.

WATCHING ZEROS IN MULTIPLICATION

You must now learn how to multiply by a three-figure multiplier when it contains a zero.

1. Multiply 456 by 320.

To multiply 456 by 320, you can multiply it by 32 and annex a zero to the result. To do this, write 320 under 456, as shown here, letting the 0 stand out at the right. When you begin the work, first write the 0 of 320 below the line and then multiply by 2 and by 3. Note that the 8 of 1368 is written under the 3 of the multiplier.

$ \begin{array}{r} 456 \\ \underline{320} \\ 9120 \\ 1368 \\ \hline 145920 \end{array} $	Write this 0 before multiplying by 2.
$ \begin{array}{r} 1368 \leftarrow \\ \hline 145920 \end{array} $	This 8 comes under the 3 of 320.

2. Find the product of 456 and 302.

$ \begin{array}{r} A \\ 456 \\ \underline{302} \\ 912 \\ 000 \\ 1368 \\ \hline 137712 \end{array} $	$ \begin{array}{r} B \\ 456 \\ \underline{302} \\ 912 \\ 1368 \leftarrow \\ \hline 137712 \end{array} $	You could do the work as shown in A, but it is shorter to omit the row of zeros and to multiply as shown in B. This 8 must be written under the 3 of 302.
--	---	--

Exercises

Multiply. Check the work as shown on page 49:

- | | | |
|---------------|---------------|----------------|
| 1. 364 by 708 | 5. 574 by 860 | 9. 603 by 360 |
| 2. 597 by 510 | 6. 507 by 970 | 10. 475 by 403 |
| 3. 289 by 607 | 7. 928 by 308 | 11. 356 by 802 |
| 4. 256 by 409 | 8. 643 by 590 | 12. 924 by 920 |

PROBLEMS

1. The owner of a bird store bought 270 canaries at \$3.98 apiece. How much did they cost in all?

2. Mr. Carter sold 265 umbrellas at \$1.95 each. How much did he receive in all?

3. Daniel worked in a garden for 263 days at \$3.75 a day. What were his wages for the year?

4. On a ranch there are 214 horses worth \$115 each. How much are all the horses worth?

5. Last summer 232 members of our club took a boat ride. The fare was \$3.46 for each person. How much was the fare for all of us?

6. The fare from Boston to New York by boat is \$6.25. If the ticket agent sold 304 tickets for one trip, what was the total amount he received?

7. The fare from Seattle to China is \$365. If a ship left Seattle with 207 passengers aboard, how much money did the ticket agent receive in fares?

8. An automobile agent sells 371 cars during the year. He receives \$775 for each car. How much does he receive for all the cars?

9. The round trip from New York to Albany is 298 miles. A conductor on a train made 310 round trips last year. How many miles did he travel during the year?

10. If an airplane can travel 115 miles an hour, how far can it go in 13 hours?

ALWAYS MULTIPLY THE EASIER WAY

Mr. Clark sold 223 wool sweaters at \$5 each. How much did he receive for them?

You must multiply \$5 by 223. You could do this by writing 5 over 223, as shown in *A*; but it is awkward to multiply like this. It is much easier to multiply as shown in *B*, and you get the same answer because 5×223 gives the same product as 223×5 .

When you do the work as shown in *B*, you must remember that the result, 1115, stands for dollars.

Mr. Clark received \$1115 for the sweaters.

$ \begin{array}{r} A \\ 5 \\ \hline 223 \\ 15 \\ 10 \\ 10 \\ \hline \rightarrow 1115 \end{array} $	$ \begin{array}{r} B \\ 223 \\ \hline 5 \\ \hline \rightarrow 1115 \end{array} $
--	---

By reading the problem, you see that the answer must be dollars. Hence 1115 stands for \$1115.

Exercises

First decide whether the answer will be dollars or some other quantity. Then multiply the easier way.

1. Mr. Carter sold 112 tennis rackets for \$3 each. How much did he receive for all of them?
2. Jack's geography weighs 2 lb. How much would 126 geographies weigh?
3. Mr. Smith sells sugar in 2-pound boxes. How many pounds of sugar are there in 72 boxes?

Multiply the following the easier way:

- | | | |
|---------------------|--------------------|-------------------------|
| 4. $654 \times \$2$ | 7. $153 \times 5¢$ | 10. 67×4 pears |
| 5. $762 \times \$8$ | 8. $217 \times 3¢$ | 11. 85×2 pens |
| 6. $819 \times \$5$ | 9. $318 \times 4¢$ | 12. 49×3 feet |

PROBLEMS

Always write the numbers so that they may be multiplied the easier way.

1. Mary's aunt sells hats in a millinery store. Last week at a sale she sold 163 hats at \$4 each. How much did she get for all these hats?



2. Another week she sold 143 hats at \$2.75 each and 79 hats at \$2 each. How much did she get for them all together?

3. How much did she receive for 2 hats at \$7.35 each? for 6 hats at \$6.98 each?

4. One month Mary's aunt sold 148 hats at \$2 each, 107 hats at \$3 each, 96 hats at \$5 each, 59 hats at \$10 each, and 48 hats at \$15 each. What was the total amount of her sales that month?

5. There are 24 hours in a day and 365 days in a year. How many hours are there in a year?

6. Mr. Rice has 185 baskets, each containing 20 apples. How many apples has he in all?

7. A clothing store bought 305 winter coats at \$35 each. How much did the coats cost all together?

8. A school needs 114 new desks. How much will they cost at \$15 each?

DIVISORS ENDING IN 6, 7, 8, OR 9

1. How many 40's are there in 82? in 125?
2. How many 39's are there in 82? in 125?
3. You see that there are the same number of 39's in 125 as there are 40's, since 39 is almost equal to 40.

Since 39 almost equals 40, an easy way to find the number of 39's in 125 is *first to think of 39 as 40*, and then to think " $12 \div 4 = 3$." To make sure that 3 is the right quotient, multiply 39 by 3, which gives 117; then subtract 117 from 125, which leaves 8. Since 8 is less than 39, 3 is right.

3 ←	3 is right because 8 is less than 39.
39)125	
117	
8 ←	

4. Divide 262 by 48.

First think of 48 as 50, and then think " $26 \div 5$ gives 5." Multiply 48 by 5 and subtract. How do you know that 5 is right?

5
48)262
240
22

5. The same method may be used to estimate the quotient whenever you divide by 56, 57, 58, or 59, or by 66, 67, 68, or 69, or by any other two-figure divisor ending in 6, 7, 8, or 9.

Thus, to divide 300 by 57, first think of 57 as 60 and then think " $30 \div 6 = 5$." To divide by 66, 67, 68, or 69, first think of each number as 70 and then divide by 7.

6. Of what number do you think when you estimate the quotient with the divisor 49? 69? 78?

When a two-figure divisor ends in 6, 7, 8, or 9, divide by 1 more than the first figure of the divisor to estimate the quotient.

SELLING APPLES AT SCHOOL

Our school lunchroom sold 824 apples in 39 days. This was an average of how many apples per day?

You must first divide 82 by 39. Since 39 is nearly 40, think " $8 \div 4 = 2$." Write 2 in the quotient. Then think " $2 \times 39 = 78$." Subtract 78 from 82, which gives 4 as a remainder. Since 4 is less than 39, 2 is the right quotient.

To get the next quotient figure, divide 44 by 39, thinking " $4 \div 4 = 1$." Write 1 in the quotient. How do you know that 1 is right?

The quotient is 21 and the remainder is 5. The lunchroom sold, on an average, a little over 21 apples a day.

Check by multiplying 21 by 39 and adding 5 to the result.

$$\begin{array}{r} 21 \\ 39 \overline{)824} \\ \underline{78} \\ 44 \\ \underline{39} \\ 5 \end{array}$$

Exercises

1. During the fall the school lunchroom sold 821 apples in 29 days. How many apples, on an average, were sold each day?

2. During the spring 1180 apples were sold in 49 days. Find the average number sold per day.

Divide and check. Write R before each remainder:

- | | | |
|------------------|--------------------|--------------------|
| 3. $96 \div 29$ | 9. $272 \div 88$ | 15. $2411 \div 36$ |
| 4. $183 \div 59$ | 10. $567 \div 69$ | 16. $3057 \div 58$ |
| 5. $128 \div 36$ | 11. $932 \div 29$ | 17. $1654 \div 37$ |
| 6. $354 \div 49$ | 12. $800 \div 38$ | 18. $2896 \div 67$ |
| 7. $253 \div 47$ | 13. $1669 \div 77$ | 19. $9568 \div 79$ |
| 8. $633 \div 88$ | 14. $3788 \div 59$ | 20. $4434 \div 19$ |

USING DIVISION

1. Jack has 151 books. If he puts 28 books on each shelf of his bookcase, how many shelves will be filled? Will there be a shelf partly filled?

2. May has 82¢ to spend for her party. At 19¢ each, how many cakes can she buy?

(In estimating the quotient, think of 19 as 20.)

3. At 69¢ each, how many phonograph records can you buy for \$2.14? How much will you have left?

First change \$2.14 to 214¢. Then divide 214 by 69.

4. If an airplane averages 98 mi. an hour, about how many hours will it take it to travel 1481 mi.?

Since the divisor is 98, divide by 1 more than the first figure of 98 to estimate the quotient figure. The trial divisor is 10. To estimate the first quotient figure, think "14 ÷ 10 gives 1."

Divide and check. Write R before each remainder:

- | | | |
|--------------------|--------------------|----------------------|
| 5. $2736 \div 28$ | 15. $9792 \div 28$ | 25. $16,504 \div 38$ |
| 6. $2774 \div 88$ | 16. $5896 \div 47$ | 26. $21,688 \div 98$ |
| 7. $1230 \div 39$ | 17. $6094 \div 27$ | 27. $24,349 \div 39$ |
| 8. $1599 \div 48$ | 18. $8163 \div 39$ | 28. $14,011 \div 19$ |
| 9. $1897 \div 59$ | 19. $9747 \div 68$ | 29. $37,890 \div 59$ |
| 10. $2225 \div 67$ | 20. $5273 \div 19$ | 30. $24,085 \div 59$ |
| 11. $4903 \div 79$ | 21. $9606 \div 29$ | 31. $21,010 \div 96$ |
| 12. $3589 \div 49$ | 22. $6018 \div 29$ | 32. $35,154 \div 99$ |
| 13. $4422 \div 56$ | 23. $2770 \div 89$ | 33. $48,543 \div 86$ |
| 14. $4874 \div 77$ | 24. $5798 \div 78$ | 34. $48,206 \div 97$ |

REMAINDERS LARGER THAN THE DIVISOR

Paul has \$2.38 and wants to know how many tennis balls he can buy at 39¢ each. \$2.38 is the same as 238¢. Hence Paul has to divide 238 by 39.

Paul first does the work as shown below in *A*. Since 39 is nearly 40, he thinks " $23 \div 4$ gives 5." But when he tries 5 as quotient, he gets a remainder of 43. This means that he will have 43¢ left over if he buys 5 balls. Since 43¢ is more than 39¢, he can buy another ball if he has 43¢ left. Hence 5 is too small as quotient.

A

$$\begin{array}{r} 5 \leftarrow \\ 39 \overline{)238} \\ \underline{195} \\ 43 \leftarrow \end{array}$$

5 is too small because 43 is larger than 39.

B

$$\begin{array}{r} 6 \leftarrow \\ 39 \overline{)238} \\ \underline{234} \\ 4 \leftarrow \end{array}$$

6 is right because 4 is less than 39.

Paul then tries 6 as quotient, as shown in *B*. This gives a remainder of 4. Since 4 is less than 39, 6 is right.

Paul can buy 6 balls and he will have 4¢ left.

When the remainder is equal to or larger than the divisor, make the quotient 1 larger.

Exercises

Divide, using the rule on page 54. Check the work:

- | | | |
|-----------------|-------------------|-------------------|
| 1. $89 \div 29$ | 6. $178 \div 29$ | 11. $841 \div 87$ |
| 2. $79 \div 37$ | 7. $296 \div 49$ | 12. $709 \div 78$ |
| 3. $77 \div 39$ | 8. $418 \div 59$ | 13. $473 \div 66$ |
| 4. $84 \div 26$ | 9. $556 \div 69$ | 14. $236 \div 58$ |
| 5. $88 \div 27$ | 10. $715 \div 79$ | 15. $329 \div 46$ |

THE SOCIAL CLUB HAS A PARTY

1. The Atwood Social Club is giving a party. The total cost will be \$36.40. The members of the club agree to pay $\frac{1}{4}$ of this amount. How much will the members pay all together?

2. If the club has 26 members, how much will each one have to pay?

3. The remaining \$27.30 is to be collected on tickets to the party. If the club plans to sell 78 tickets, how much should it charge for each ticket?

4. If the 26 members sell 78 tickets in all, what is the average number of tickets sold per member?

5. The members are making 475 paper flowers to decorate the tables. If 19 members share equally in this work, how many flowers must each make?

Divide. If there is a remainder, write R before it:

- | | | |
|--------------------|--------------------|----------------------|
| 6. $1779 \div 57$ | 16. $3072 \div 48$ | 26. $59,620 \div 99$ |
| 7. $2795 \div 38$ | 17. $3659 \div 57$ | 27. $17,591 \div 49$ |
| 8. $2992 \div 49$ | 18. $2895 \div 76$ | 28. $47,817 \div 77$ |
| 9. $5592 \div 69$ | 19. $2412 \div 67$ | 29. $42,123 \div 57$ |
| 10. $4795 \div 77$ | 20. $5568 \div 96$ | 30. $53,756 \div 89$ |
| 11. $1751 \div 56$ | 21. $1320 \div 28$ | 31. $18,984 \div 28$ |
| 12. $1976 \div 37$ | 22. $2686 \div 79$ | 32. $20,630 \div 97$ |
| 13. $6973 \div 98$ | 23. $2499 \div 58$ | 33. $28,497 \div 69$ |
| 14. $1566 \div 36$ | 24. $7310 \div 86$ | 34. $26,233 \div 37$ |
| 15. $4193 \div 59$ | 25. $4256 \div 56$ | 35. $22,496 \div 37$ |

FINDING QUOTIENT FIGURES AT A GLANCE

When the dividend or the partial dividend is only slightly larger than the divisor, you see at a glance that the quotient is 1.

For example, you easily see in *A* that 39 contains 37 just once; hence $39 \div 37$ gives 1.

Similarly, in dividing 583 by 56, as shown in *B*, you see that the partial dividend 58 contains 56 only once; hence the first figure of the quotient must be 1.

$$\begin{array}{r} A \\ 37 \overline{)39} \\ \underline{37} \\ 2 \end{array}$$

$$\begin{array}{r} B \\ 56 \overline{)583} \\ \underline{56} \end{array}$$

When you get the quotient figure like this, you say that you find it by *inspection*. This method also tells you quickly when the quotient figure is 0.

In the example at the right, after subtracting 56 from 58 and bringing down 3, you see that 23 does not contain 56; hence you write 0 as the second figure of the quotient.

$$\begin{array}{r} 10 \\ 56 \overline{)583} \\ \underline{56} \\ 23 \end{array}$$

Exercises

Find the quotients by inspection, when possible; otherwise use the rules on pages 37 and 54:

$$1. 27 \overline{)28} \quad 6. 36 \overline{)38} \quad 11. 39 \overline{)23} \quad 16. 48 \overline{)49}$$

$$2. 39 \overline{)96} \quad 7. 17 \overline{)19} \quad 12. 97 \overline{)98} \quad 17. 46 \overline{)22}$$

$$3. 26 \overline{)26} \quad 8. 38 \overline{)84} \quad 13. 27 \overline{)99} \quad 18. 19 \overline{)63}$$

$$4. 56 \overline{)54} \quad 9. 56 \overline{)57} \quad 14. 87 \overline{)43} \quad 19. 29 \overline{)96}$$

$$5. 28 \overline{)73} \quad 10. 68 \overline{)13} \quad 15. 88 \overline{)88} \quad 20. 27 \overline{)5}$$

USING LONG DIVISION

1. An airplane traveled 2109 miles in 19 hours. How many miles per hour did it average?

2. Last week the school bookstore paid \$29.16 for 27 dictionaries. What was the price of 1 dictionary?

Divide, using the method on page 59 when possible:

- | | | |
|-------------------|--------------------|--------------------|
| 3. $408 \div 37$ | 9. $5843 \div 56$ | 15. $286 \div 26$ |
| 4. $290 \div 29$ | 10. $8902 \div 88$ | 16. $398 \div 36$ |
| 5. $4911 \div 46$ | 11. $2925 \div 28$ | 17. $290 \div 26$ |
| 6. $7903 \div 77$ | 12. $3962 \div 38$ | 18. $9925 \div 96$ |
| 7. $2780 \div 26$ | 13. $4803 \div 46$ | 19. $6950 \div 66$ |
| 8. $6905 \div 67$ | 14. $7841 \div 76$ | 20. $1011 \div 98$ |

Review Exercises

Divide, using the rules on pages 37 and 54:

- | | | |
|-------------------|--------------------|----------------------|
| 1. $1575 \div 21$ | 8. $3356 \div 53$ | 15. $11,742 \div 53$ |
| 2. $1550 \div 55$ | 9. $2989 \div 49$ | 16. $39,429 \div 69$ |
| 3. $3244 \div 37$ | 10. $4218 \div 74$ | 17. $12,232 \div 44$ |
| 4. $7282 \div 22$ | 11. $1638 \div 42$ | 18. $58,183 \div 83$ |
| 5. $5544 \div 88$ | 12. $8590 \div 98$ | 19. $19,458 \div 47$ |
| 6. $4576 \div 44$ | 13. $3008 \div 64$ | 20. $36,480 \div 64$ |
| 7. $4871 \div 78$ | 14. $7371 \div 63$ | 21. $47,554 \div 59$ |

NOTE. For all 2-figure divisors above 18, the methods on pages 37, 54, and 59 give the correct quotient figure at the first estimate in about 75% of all cases. In practically all other cases the correct quotient figure is easily obtained by changing the estimated quotient by 1, as explained on pages 43 and 57.

DIVISORS FROM 13 TO 18

When the divisor is 13, 14, 15, 16, 17, or 18, the rules on pages 37 and 54 do not give the correct quotient figures. When you use these divisors, you must estimate the quotient figure as well as you can and then multiply *mentally* to see if the estimated quotient is right. To divide by 19, however, think of 19 as 20.

1. Divide 798 by 14.

$$\begin{array}{r} 57 \\ 14 \overline{) 798} \\ \underline{70} \\ 98 \\ \underline{98} \\ 0 \end{array}$$

If you try 6 as the first quotient figure and multiply 14 by 6 mentally, you get 84; hence 6 is too large. Then try 5.

2. An easy way to multiply 13, 14, 15, 16, 17, and 18 *mentally* by any number from 1 to 9 is to begin multiplying at the left instead of the right.

For example, to multiply 17 by 5 remember that the 1 in 17 means 10. Then, beginning at the left of 17, think as follows: " $5 \times 10 = 50$. $5 \times 7 = 35$. $50 + 35 = 85$."

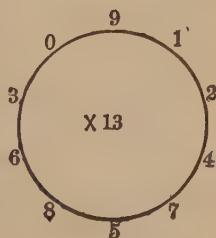
To multiply 18 by 7, think " $70 + 56 = 126$."

To multiply 13 by 9, think " $90 + 27 = 117$."

Exercises

1. Play this game. Multiply 13 mentally by each number on the circle.

2. Play the game again with 14 in the middle, instead of 13. Then place 15 in the middle; then 16; then 17; then 18.



TRAVELING TO FOREIGN COUNTRIES

1. It took Uncle Joe 18 days to go from New York to Brazil, a distance of 4374 miles. This is an average of how many miles a day?

How many miles a day, on the average, would you travel if you made each of the following trips from New York in the given time?

2. A trip of 4667 miles to Spain in 13 days.
3. A trip of 5810 miles to Turkey in 14 days.
4. A trip of 6016 miles to Egypt in 16 days.
5. A trip of 5355 miles to Iceland in 15 days.
6. A trip of 8721 miles to Japan in 17 days.
7. A trip of 6875 miles to Chile in 25 days.
8. A trip of 10,442 miles to China in 23 days.

Divide the following and check the work :

- | | | |
|-------------------|--------------------|----------------------|
| 9. $544 \div 17$ | 19. $7928 \div 14$ | 29. $10,452 \div 13$ |
| 10. $765 \div 15$ | 20. $5376 \div 17$ | 30. $13,104 \div 14$ |
| 11. $592 \div 16$ | 21. $7668 \div 18$ | 31. $10,672 \div 16$ |
| 12. $306 \div 18$ | 22. $5552 \div 16$ | 32. $16,055 \div 17$ |
| 13. $960 \div 15$ | 23. $1081 \div 13$ | 33. $12,210 \div 18$ |
| 14. $767 \div 13$ | 24. $1261 \div 13$ | 34. $10,625 \div 17$ |
| 15. $812 \div 14$ | 25. $9135 \div 15$ | 35. $12,988 \div 17$ |
| 16. $986 \div 17$ | 26. $6849 \div 18$ | 36. $13,198 \div 18$ |
| 17. $845 \div 13$ | 27. $9542 \div 13$ | 37. $14,853 \div 18$ |
| 18. $109 \div 16$ | 28. $2941 \div 17$ | 38. $12,960 \div 18$ |

CAN YOU FIND THE MISTAKES?

Check the work in each of these problems by multiplying the quotient by the divisor and adding the remainder, if there is one. If you find that a problem is wrong, try to discover all the mistakes in it. Then do the problem correctly and check your work.

1.	2.	3.	4.
35	44	31	67
27 $\overline{)8235}$	73 $\overline{)3139}$	32 $\overline{)9920}$	29 $\overline{)1943}$
81	282	96	174
<u>135</u>	<u>319</u>	<u>32</u>	<u>203</u>
135	282	32	203
	<u>37</u>		
5.	6.	7.	8.
716	318	335	936
27 $\overline{)2322}$	29 $\overline{)9222}$	47 $\overline{)15745}$	23 $\overline{)1898}$
189	87	141	207
<u>43</u>	<u>52</u>	<u>164</u>	<u>82</u>
27	29	141	69
<u>162</u>	<u>232</u>	<u>235</u>	<u>138</u>
162	232	215	138
		<u>20</u>	

Check the problems below by multiplying to see if the answers are correct. If a problem is wrong, work it and find the right quotient. Then check it.

- | | |
|----------------------------|----------------------------|
| 9. $16,252 \div 34 = 478$ | 13. $63,804 \div 86 = 754$ |
| 10. $20,154 \div 46 = 449$ | 14. $41,534 \div 53 = 878$ |
| 11. $17,019 \div 61 = 279$ | 15. $37,235 \div 55 = 677$ |
| 12. $21,844 \div 43 = 508$ | 16. $13,795 \div 37 = 635$ |

BUYING ON INSTALLMENTS

1. Mr. Edwards bought a secondhand car for \$325. How many months did it take to pay for it at the rate of \$25 a month?

2. Mrs. Jones bought some new furniture on the installment plan for \$378. If she pays \$27 a month, how many months will it take her to pay for it?

3. If you pay \$.75 a week, how many weeks will it take to pay for a watch costing \$10.50?

Change \$.75 to 75¢ and \$10.50 to 1050¢.

Review

Divide, and check the work:

- | | | |
|--------------------|--------------------|----------------------|
| 1. $6657 \div 21$ | 14. $3138 \div 57$ | 27. $26,050 \div 38$ |
| 2. $3025 \div 55$ | 15. $1829 \div 31$ | 28. $11,330 \div 22$ |
| 3. $7056 \div 14$ | 16. $8001 \div 63$ | 29. $21,090 \div 74$ |
| 4. $3082 \div 23$ | 17. $3010 \div 94$ | 30. $18,215 \div 28$ |
| 5. $3603 \div 67$ | 18. $8175 \div 75$ | 31. $35,990 \div 59$ |
| 6. $4864 \div 76$ | 19. $9009 \div 33$ | 32. $37,008 \div 72$ |
| 7. $7015 \div 61$ | 20. $8059 \div 25$ | 33. $45,699 \div 65$ |
| 8. $3712 \div 64$ | 21. $8642 \div 17$ | 34. $20,188 \div 52$ |
| 9. $4914 \div 18$ | 22. $3119 \div 49$ | 35. $35,789 \div 89$ |
| 10. $2466 \div 58$ | 23. $6248 \div 88$ | 36. $30,073 \div 59$ |
| 11. $6605 \div 99$ | 24. $7878 \div 26$ | 37. $38,583 \div 87$ |
| 12. $3809 \div 86$ | 25. $2927 \div 78$ | 38. $83,616 \div 96$ |
| 13. $6279 \div 69$ | 26. $9105 \div 15$ | 39. $27,720 \div 63$ |

TONS AND POUNDS

1. Jack bought 3 lb. of sugar and a 4-ounce can of baking powder and carried them home. He also ordered 2 tons of coal. Did he carry the coal home? Why not?



2. By what measures of weight are these things sold: butter, spice, coffee, meat, iron, large quantities of ice, small quantities of ice, pepper, hay?

3. Learn this table of *weight*:

16 ounces (oz.)	= 1 pound (lb.)
2000 pounds (lb.)	= 1 ton (T.)

4. A farmer received \$13.75 a ton for his 9 T. of hay. How much did he receive in all?

5. Last year Mr. Forbes used 13 T. of coal to heat his house. How much did it cost at \$14 a ton?

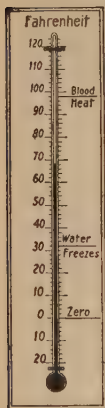
6. One of the elevators in a large building can carry only 1600 lb. How many men each weighing 200 lb. can ride on this elevator at the same time?

7. A 2-ton delivery truck can carry a load of 2 T., or 4000 lb. How many pounds can a 3-ton truck carry?

8. Every day last year Mrs. Fuller got 25 lb. of ice. In how many days did she use a ton of ice?

HOW TO READ THE THERMOMETER

When we want to know how hot or how cold it is, we look at a thermometer and read the number of *degrees* of temperature. The mercury in the tube rises as the temperature becomes warmer and falls as it becomes colder.



This thermometer shows a temperature of 68 degrees (written 68°). This is the most comfortable indoor temperature during the day for our schoolrooms or homes; but at night, if we are sleeping well covered, we are more comfortable in a much cooler room.

Notice that there are five small spaces between 60 and 70. Each small space stands for 2 degrees.

Show where the mercury would be if the temperature were 62° ; 66° ; 74° ; 90° ; 65° .

When it is cold enough for water to freeze, the temperature is 32° . This is called the *freezing point*. If it gets still colder, the mercury may drop to zero. When it is very cold, the mercury goes below zero.

When it is very hot, the temperature may rise to 90° or more. Water boils at 212° .

If you have a fever, your temperature may rise to 100° or even to 102° or 103° ; but when you are well, your bodily temperature is about $98\frac{1}{2}^{\circ}$. This is called *blood heat*.

MEASURING TEMPERATURE

1. Read the temperature on each thermometer. The last one shows a temperature below zero.



2. Jack was studying in his room when the temperature was 74° . How many degrees too warm was it?

3. How many degrees above zero is the freezing point?

4. Jim went skating when the temperature was 20° . How many degrees below the freezing point was it?

5. Last Christmas Day the temperature at our house was 68° indoors and 22° outdoors. How many degrees colder was it outdoors than indoors? Was it cold enough for the pond to freeze?

6. Newspapers often print weather reports giving the temperatures of the previous day. Find the highest and the lowest temperature yesterday in your city and the difference between them.

7. One Christmas Day the Weather Bureau reported a temperature of 66° in Southern California and one of 12° below zero in Duluth, Minnesota. What was the difference between these temperatures?

PROBLEMS

Before working these problems, tell whether you must add, subtract, multiply, or divide to get the answer.

1. Donald has saved \$8.73. If he sells his old bicycle for \$11.50, how much will he have then?
2. Mr. Carter traveled 1155 miles in his car in 7 days. How many miles did he average in a day?
3. Mary has saved \$5.88. She wants to buy a bicycle costing \$14.75. How much more money does she need?
4. Mrs. Lewis takes 14 children to Green Lake for a picnic. If the fare for each child is 35¢, how much fare does she pay for all the children?
5. Our class finds that it will cost \$8.64 to go on a picnic. If there are 32 children, what will be each child's share of the expense?
6. Catherine's mother buys a set of dining-room furniture for \$96. She pays \$8 a month. How many months will it take her to pay for the set?
7. There are 436 children in the Emerson School. Yesterday 78 children went to the museum and 81 children went to the park to study the trees. How many children were left at school?
8. Tom's daily marks in arithmetic last week were 90, 86, 70, 92, 87. What was his average mark for the week?

PROBLEMS

1. Fred planted 48 rows of lettuce in his garden, with 72 plants in each row. How many plants did he have?

2. Of Fred's lettuce plants, 2532 grew to be fine large heads of lettuce. How many dozen heads was that? How much did he get for them at 42¢ a dozen?



3. Fred spent \$27.50 of his money for radio parts, \$9.68 for a tennis racket, and \$12.65 for a scout uniform. How much did he have left?

4. Ruth has \$12.36. She spends \$7.98 for a new dress, \$3.49 for a hat, and \$.15 for car fare. How much money should she have left?

5. Find the total cost of 7 cans of peaches at 24¢ a can and 1 dozen eggs for 59¢.

6. The high-school boys gave a minstrel show. They sold 217 tickets at \$1.25 each and 114 tickets at \$.75 each. How much money did they collect?

7. Mrs. Dennis has 32 chocolate soldiers, 49 lollipops, 45 chocolate eggs, 31 fruit bars, and 23 peppermint sticks. If she puts the same number of pieces of candy into each of 12 boxes, how many pieces does she put into each box?

DRILL EXERCISES

Add the following and check the work:

1. 97	2. 94	3. 77	4. 71	5. 67	6. 15
40	68	84	25	93	66
64	47	98	38	32	40
88	56	70	50	85	57
11	90	36	42	10	57
46	39	66	36	89	82
89	75	89	79	93	24
<u>36</u>	<u>56</u>	<u>27</u>	<u>54</u>	<u>39</u>	<u>39</u>

Subtract the following and check the work:

7. \$517.00	8. \$901.00	9. \$750.90	10. \$631.01
<u>238.14</u>	<u>376.48</u>	<u>643.09</u>	<u>401.07</u>

Multiply the following and check the work:

11. 187 by 409	13. 483 by 270	15. 609 by 250
12. 481 by 630	14. 405 by 916	16. 357 by 823

Divide the following and check the work:

17. $149 \div 7$	24. $7168 \div 32$	31. $16,539 \div 37$
18. $385 \div 9$	25. $4482 \div 54$	32. $50,991 \div 69$
19. $413 \div 8$	26. $2277 \div 65$	33. $30,566 \div 58$
20. $618 \div 6$	27. $7698 \div 45$	34. $27,963 \div 29$
21. $750 \div 5$	28. $9300 \div 62$	35. $12,988 \div 17$
22. $910 \div 14$	29. $8569 \div 41$	36. $10,192 \div 16$
23. $5175 \div 23$	30. $4221 \div 63$	37. $65,980 \div 78$

CHAPTER II

LARGE NUMBERS

1. When you write numbers of 7 or more figures, you are writing *millions*. Large cities like New York, Paris, and London have populations of several *millions* of people.

2. A million is equal to 1000 thousand.

8 million is written thus: 8,000,000

294 million is written thus: 294,000,000

3. You have seen that it is easier to read a large number if you put commas between the groups of three figures, counting from the right. These groups are called **periods**. The first group at the right is the *units' period*, the second is the *thousands' period*, and the third is the *millions' period*.

Millions	Thousands	Units
$\overbrace{102}$	$\overbrace{408}$	$\overbrace{007}$
1 0 2 , 4 0 8 , 0 0 7		

This number is read *102 million, 408 thousand, 7*.

The number 200,005,060 is read *200 million, 5 thousand, 60*.

4. Count by millions from 1,000,000 to 25,000,000.

5. Look in a newspaper and find all the numbers you can that contain millions.

USING MILLIONS

Read the following sentences :

1. One year money was deposited in the savings banks of the United States by 15,161,799 persons.

2. In a recent year the city of New York had a population of 6,139,520, while London had a population of 7,665,883.

3. One year our country had 105,710,620 inhabitants, including 11,573,230 children.

4. Kansas produced 128,100,000 bushels of wheat in one year, while Iowa produced 441,450,000 bushels of corn during the same year.

Read the following numbers :

5. 2,412,550 26,954,120 999,007,479

6. 9,700,080 50,594,006 256,056,807

7. 4,001,000 26,009,458 705,108,025

Write the following numbers in figures :

8. 18 million, 23 thousand, one hundred four.

9. 13 million, 150 thousand, seventy-nine.

10. Forty million, six thousand, seven.

11. One hundred fifty-six million, two hundred.

12. Seven million, five hundred thousand.

13. Beatrice was told that Mr. Coe is a *millionaire*. What does that mean?

14. What is the largest and the smallest number that you can write with 6 figures? with 7 figures?

ROMAN NUMERALS ABOVE 30

You have learned how to write Roman numerals to 30. All Roman numerals are written with seven letters, which have the following values :

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

The tens and hundreds are written as follows :

30 = XXX	70 = LXX	200 = CC	600 = DC
40 = XL	80 = LXXX	300 = CCC	700 = DCC
50 = L	90 = XC	400 = CD	800 = DCCC
60 = LX	100 = C	500 = D	900 = CM

The above table illustrates these rules for finding the value of two letters that are written side by side :

(1) If the letters are alike, add them. Thus, XXX = 30 ; CC = 200.

(2) If the first letter is of greater value than the second, add them. Thus, LX = 60 ; DC = 600.

(3) If the first letter is of less value than the second, subtract them. Thus, XL = 40 ; XC = 90.

400 is sometimes written CCCC, and 900, DCCCC.

Other numbers are written as follows :

91 = XCI	73 = LXXIII	1930 = MDCCCCXXX
49 = XLIX	355 = CCCLV	(1000 + 900 + 30)

USING ROMAN NUMERALS

Roman numerals are often used on clock faces, to number chapters of books, and to write dates on buildings. In some books the pages of the preface are numbered with small Roman numerals. In a theater program, the acts of the play are numbered with Roman numerals.

1. The cornerstone of a certain church reads: "Built MDCCCVIII." When was the church built?

2. At \$2.50 per M, how much will 3000 envelopes cost? Remember that M = 1000.

3. Write the year of your birth in Roman numerals.

4. Tim has a set of encyclopedias. The last volume is XXXIV. How many volumes are there?

5. Mr. Brown had in his purse a bill that had XX printed on it. How many dollars was this bill?

6. On what coin do you sometimes find the letter V?

Read these numbers:

7. XXXI	LVI	LXXV	MCDXCIX
8. LXIII	CII	MMCX	MDCCCLV
9. XCVII	CCX	MDCX	MDCCCCV
10. XLIX	DCI	DCXL	MCCCCXCII

Write the following in Roman numerals:

11. 48	79	104	636	1220	1884
12. 64	99	487	843	1535	1915

REVIEW OF ADDITION

Copy and add the following. Check the work:

1. 69	2. 17	3. 47	4. 17	5. 47	6. 32
38	25	32	26	30	24
30	89	79	92	62	71
66	75	10	84	58	52
26	21	48	70	46	59
42	68	56	56	15	10
50	80	63	39	30	84
92	73	95	56	13	11
88	41	44	93	58	99
<u>87</u>	<u>16</u>	<u>30</u>	<u>38</u>	<u>43</u>	<u>89</u>

7. 47,261	8. 58,906	9. 84,570	10. 50,008
<u>76,255</u>	<u>20,204</u>	<u>26,789</u>	<u>90,999</u>

Add without copying. Practice until you can do and check the following 7 examples in 7 minutes:

11. 1	12. 5	13. 1	14. 7	15. 2	16. 8	17. 3
7	1	9	2	9	6	4
9	1	8	4	8	1	4
3	9	5	4	4	6	3
5	5	7	1	2	4	5
0	0	2	6	6	1	3
7	3	3	7	7	0	9
8	9	8	0	6	5	0
4	7	0	6	0	7	1
5	0	4	8	9	9	3
2	6	5	4	3	0	2
0	3	8	7	8	7	5
<u>9</u>	<u>8</u>	<u>6</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>7</u>

DRILL IN ADDITION

Add without copying. Practice examples 1 to 8 until you can do and check 4 examples in 8 minutes:

1. 8623	2. 5856	3. 4036	4. 3625
5365	1746	9179	9787
1192	4315	2026	4208
9770	1830	2660	9189
3804	6049	9531	3420
7249	7587	4839	3215
<u>5346</u>	<u>9624</u>	<u>6353</u>	<u>4627</u>

5. 4261	6. 2510	7. 9651	8. 7320
7937	7309	6347	7962
8860	8679	1044	8363
6507	4980	5540	5440
5681	4072	7701	4084
2014	6945	3927	1918
<u>8879</u>	<u>1538</u>	<u>5856</u>	<u>8656</u>

9. \$429.07	10. \$127.33	11. \$216.35	12. \$983.26
<u>536.04</u>	<u>924.76</u>	<u>795.00</u>	<u>524.07</u>

Copy, add, and check the work:

13. \$627.08	14. \$124.08	15. \$ 73.62	16. \$845.66
60.74	992.32	974.44	153.04
5.70	5.20	338.78	282.25
329.54	.19	660.60	6.90
56.39	65.53	9.72	5.98
8.09	98.87	930.09	69.17
<u>961.73</u>	<u>248.44</u>	<u>168.47</u>	<u>732.61</u>

REVIEW OF SUBTRACTION

1. Edward had a collection of 1017 stamps. He sold some of them and now has 878 stamps left. How many stamps did he sell?

2. One day 1278 people attended a matinée at a theater and 1829 people saw the evening performance. How many more people went in the evening than in the afternoon?

3. Mr. Harrison earns \$3775 a year. If he pays \$980 for rent and \$1100 for food for his family, how much has he left for other expenses?

4. Jim's brother saved \$600.00. He spent \$480.47 for a trip to California. How much had he left?

Practice until you can subtract and check 8 examples in 6 minutes:

5. $\begin{array}{r} \$4630.61 \\ 754.22 \\ \hline \end{array}$	10. $\begin{array}{r} \$7767.11 \\ 871.67 \\ \hline \end{array}$	15. $\begin{array}{r} \$1096.20 \\ 956.60 \\ \hline \end{array}$	20. $\begin{array}{r} \$9233.24 \\ 986.19 \\ \hline \end{array}$
---	--	--	--

6. $\begin{array}{r} \$8645.13 \\ 5960.77 \\ \hline \end{array}$	11. $\begin{array}{r} \$8500.67 \\ 775.59 \\ \hline \end{array}$	16. $\begin{array}{r} \$6430.92 \\ 473.23 \\ \hline \end{array}$	21. $\begin{array}{r} \$3911.43 \\ 960.89 \\ \hline \end{array}$
--	--	--	--

7. $\begin{array}{r} \$1075.46 \\ 838.56 \\ \hline \end{array}$	12. $\begin{array}{r} \$1841.76 \\ 753.19 \\ \hline \end{array}$	17. $\begin{array}{r} \$8792.29 \\ 4884.43 \\ \hline \end{array}$	22. $\begin{array}{r} \$7153.59 \\ 519.80 \\ \hline \end{array}$
---	--	---	--

8. $\begin{array}{r} \$8640.19 \\ 2848.82 \\ \hline \end{array}$	13. $\begin{array}{r} \$5510.36 \\ 821.34 \\ \hline \end{array}$	18. $\begin{array}{r} \$3753.18 \\ 847.61 \\ \hline \end{array}$	23. $\begin{array}{r} \$9149.01 \\ 973.14 \\ \hline \end{array}$
--	--	--	--

9. $\begin{array}{r} \$7008.63 \\ 2436.79 \\ \hline \end{array}$	14. $\begin{array}{r} \$6239.72 \\ 866.73 \\ \hline \end{array}$	19. $\begin{array}{r} \$4717.55 \\ 819.26 \\ \hline \end{array}$	24. $\begin{array}{r} \$2000.00 \\ 628.45 \\ \hline \end{array}$
--	--	--	--

WATCHING ZEROS IN MULTIPLICATION

1. John wants to know how much money he can save in 280 days if he saves \$.17 a day.

To multiply \$.17 by 280, John writes 280 under \$.17, with the 0 of 280 standing out at the right. Below the line he writes a 0 under the 0 of 280; then he multiplies 17 by 8 and by 2.

$ \begin{array}{r} \$.17 \\ \times 280 \\ \hline 1360 \\ 34 \\ \hline \$47.60 \end{array} $	{	This 0 comes under the 0 of 280.
$ \begin{array}{r} 1360 \\ 34 \\ \hline \end{array} $	←	This 4 comes under the 2 of 280.

Notice that when John multiplies by 2, he writes 34 with its 4 directly under the 2.

Is John's multiplication correct? How much can he save?

2. Charles wants to know how much he will earn if he works 203 days at \$2.34 a day.

In multiplying \$2.34 by 203, Charles is careful to write the 8 of 468 under the 2 of 203. Can you tell why?

How much will Charles earn in 203 days?

$ \begin{array}{r} \$2.34 \\ \times 203 \\ \hline 702 \\ 468 \\ \hline \$475.02 \end{array} $	←	This 8 comes under the 2 of 203.
--	---	----------------------------------

Exercises

1. The Newton School needs 310 new desks. At \$5.85 each, how much will the desks cost?

Multiply. Check the work as shown on page 49:

2. $\begin{array}{r} 234 \\ \hline 509 \end{array}$	4. $\begin{array}{r} 467 \\ \hline 801 \end{array}$	6. $\begin{array}{r} 845 \\ \hline 370 \end{array}$	8. $\begin{array}{r} 925 \\ \hline 108 \end{array}$	10. $\begin{array}{r} 819 \\ \hline 690 \end{array}$
3. $\begin{array}{r} 809 \\ \hline 712 \end{array}$	5. $\begin{array}{r} 382 \\ \hline 604 \end{array}$	7. $\begin{array}{r} 675 \\ \hline 890 \end{array}$	9. $\begin{array}{r} 706 \\ \hline 305 \end{array}$	11. $\begin{array}{r} 905 \\ \hline 350 \end{array}$

REVIEW OF MULTIPLICATION

1. Our baseball team played the South Denver Lions on our athletic field. We sold 209 tickets at \$.75 each and 204 tickets at \$1.25 each. How much money did we collect for tickets?

2. When we played the Greeley team, we sold 360 tickets at \$1.15 each. How much did we collect at that game?

3. How much did we get in all if we sold 290 tickets at \$1.10 each and 305 tickets at \$.55 each?

Multiply the following and check the work:

4. $\begin{array}{r} 357 \\ 685 \end{array}$	9. $\begin{array}{r} 802 \\ 637 \end{array}$	14. $\begin{array}{r} 819 \\ 580 \end{array}$	19. $\begin{array}{r} \$9.74 \\ 839 \end{array}$	24. $\begin{array}{r} 768 \\ 7240 \end{array}$
--	--	---	--	--

5. $\begin{array}{r} 129 \\ 295 \end{array}$	10. $\begin{array}{r} 862 \\ 923 \end{array}$	15. $\begin{array}{r} 706 \\ 650 \end{array}$	20. $\begin{array}{r} \$8.25 \\ 375 \end{array}$	25. $\begin{array}{r} 846 \\ 6350 \end{array}$
--	---	---	--	--

6. $\begin{array}{r} 614 \\ 918 \end{array}$	11. $\begin{array}{r} 974 \\ 502 \end{array}$	16. $\begin{array}{r} 564 \\ 460 \end{array}$	21. $\begin{array}{r} \$9.43 \\ 706 \end{array}$	26. $\begin{array}{r} 923 \\ 6180 \end{array}$
--	---	---	--	--

7. $\begin{array}{r} 537 \\ 279 \end{array}$	12. $\begin{array}{r} 921 \\ 906 \end{array}$	17. $\begin{array}{r} 307 \\ 790 \end{array}$	22. $\begin{array}{r} \$3.78 \\ 194 \end{array}$	27. $\begin{array}{r} 865 \\ 2980 \end{array}$
--	---	---	--	--

8. $\begin{array}{r} 375 \\ 843 \end{array}$	13. $\begin{array}{r} 569 \\ 347 \end{array}$	18. $\begin{array}{r} 294 \\ 870 \end{array}$	23. $\begin{array}{r} \$3.07 \\ 603 \end{array}$	28. $\begin{array}{r} 194 \\ 3470 \end{array}$
--	---	---	--	--

A TEST IN DIVISION

Give the quotients and the remainders orally. For the entire 8 lines, $2\frac{1}{2}$ min. is an excellent record, 4 min. is good, and 5 min. is fair:

For example, in $7\overline{)39}$ say only "5, and 4 over."

1. $7\overline{)39}$	$2\overline{)15}$	$5\overline{)29}$	$8\overline{)38}$	$3\overline{)10}$	$4\overline{)23}$
2. $6\overline{)32}$	$7\overline{)22}$	$5\overline{)28}$	$8\overline{)34}$	$9\overline{)48}$	$6\overline{)17}$
3. $3\overline{)19}$	$6\overline{)28}$	$3\overline{)11}$	$9\overline{)39}$	$5\overline{)33}$	$3\overline{)16}$
4. $2\overline{)11}$	$4\overline{)26}$	$9\overline{)13}$	$3\overline{)20}$	$6\overline{)44}$	$4\overline{)18}$
5. $3\overline{)22}$	$8\overline{)29}$	$3\overline{)28}$	$7\overline{)13}$	$8\overline{)49}$	$6\overline{)15}$
6. $4\overline{)35}$	$5\overline{)17}$	$3\overline{)25}$	$9\overline{)14}$	$7\overline{)29}$	$4\overline{)14}$
7. $3\overline{)26}$	$5\overline{)27}$	$9\overline{)29}$	$8\overline{)18}$	$7\overline{)45}$	$2\overline{)19}$
8. $4\overline{)38}$	$5\overline{)31}$	$8\overline{)44}$	$7\overline{)17}$	$6\overline{)39}$	$4\overline{)11}$

Give the results orally. For these 5 lines, 2 min. is excellent, 3 min. is good, and 4 min. is fair:

9. $9\overline{)40}$	$6\overline{)53}$	$7\overline{)48}$	$6\overline{)29}$	$9\overline{)70}$	$5\overline{)38}$
10. $8\overline{)59}$	$7\overline{)67}$	$9\overline{)80}$	$7\overline{)58}$	$9\overline{)57}$	$8\overline{)14}$
11. $6\overline{)35}$	$3\overline{)29}$	$9\overline{)59}$	$8\overline{)46}$	$7\overline{)54}$	$9\overline{)17}$
12. $9\overline{)47}$	$5\overline{)23}$	$6\overline{)41}$	$8\overline{)21}$	$9\overline{)33}$	$9\overline{)21}$
13. $7\overline{)41}$	$5\overline{)14}$	$6\overline{)46}$	$7\overline{)26}$	$9\overline{)85}$	$8\overline{)71}$

A REVIEW OF LONG DIVISION

Arthur's chickens laid 879 eggs last year. This was an average of how many eggs per week? There are 52 weeks in 1 year.

You must divide 879 by 52.

Estimate each quotient figure by dividing by 5. (See the rule on page 37.)

For the first quotient figure, think "8 ÷ 5 gives 1. 1 × 52 = 52." Subtract 52 from 87. This gives a remainder of 35. Since 35 is less than 52, 1 is the right quotient figure.

Then think "35 ÷ 5 = 7." Trying 7 as quotient, you get 7 × 52 = 364, which cannot be subtracted from 359. Hence 7 is too large, and you must try 6. How do you know that 6 is right?

The quotient is 16 and the remainder, 47. You may also write the answer like this: $16\frac{47}{52}$. This means that the chickens laid an average of almost 17 eggs a week.

Check the work as shown above.

Remember that when the quotient figure is right, the remainder is less than the divisor.

<i>Problem</i>	<i>Check</i>
$\begin{array}{r} 16 \\ 52 \overline{)879} \\ \underline{52} \\ 359 \\ \underline{312} \\ 47 \end{array}$	$\begin{array}{r} 16 \\ 52 \\ \underline{32} \\ 80 \\ \underline{832} \\ 47 \\ \underline{879} \end{array}$

Exercises

Divide, using the rule on page 37. Check the work:

- | | | |
|--------------|---------------|-----------------|
| 1. 1562 ÷ 22 | 6. 2028 ÷ 75 | 11. 11,992 ÷ 23 |
| 2. 6645 ÷ 91 | 7. 6324 ÷ 93 | 12. 52,560 ÷ 72 |
| 3. 4030 ÷ 62 | 8. 3051 ÷ 44 | 13. 63,937 ÷ 84 |
| 4. 1070 ÷ 34 | 9. 5628 ÷ 84 | 14. 15,147 ÷ 51 |
| 5. 4399 ÷ 83 | 10. 2808 ÷ 72 | 15. 24,198 ÷ 32 |

DIVISORS ENDING IN 6, 7, 8, OR 9

Dick worked 39 hours last week and earned \$17.94. How much an hour did he earn?

You must divide \$17.94 by 39.

Since 39 ends in 9, estimate each quotient figure by dividing by 4, which is 1 more than the first figure of 39. (See the rule on page 54.)

To get the first quotient figure, think "17 ÷ 4 gives 4." Trying 4 as quotient, you get a remainder of 23, which is less than 39. Hence 4 is right.

Then think "23 ÷ 4 gives 5." Trying 5 as the second quotient figure, you get a remainder of 39. Since 39 *equals* the divisor, 39, you see that 5 is too small. Then try 6 as quotient figure. How can you tell that 6 is right?

You find that Dick earned \$.46 an hour.

Make the quotient figure 1 larger if the remainder is equal to or larger than the divisor.

$$\begin{array}{r}
 \$ \quad .46 \\
 39 \overline{) \$17.94} \\
 \underline{156} \\
 234 \\
 \underline{234} \\
 0
 \end{array}$$

Exercises

Divide. Check the work by multiplying:

- | | | |
|--------------|---------------|-----------------|
| 1. 6794 ÷ 89 | 7. 2856 ÷ 56 | 13. 20,395 ÷ 49 |
| 2. 5398 ÷ 87 | 8. 4899 ÷ 69 | 14. 33,263 ÷ 57 |
| 3. 5461 ÷ 56 | 9. 3593 ÷ 67 | 15. 50,838 ÷ 68 |
| 4. 2239 ÷ 48 | 10. 3984 ÷ 48 | 16. 35,792 ÷ 89 |
| 5. 4538 ÷ 79 | 11. 1599 ÷ 39 | 17. 47,348 ÷ 76 |
| 6. 6584 ÷ 88 | 12. 4754 ÷ 76 | 18. 15,290 ÷ 37 |

19. A merchant paid \$13.72 for 49 caps. What was the price paid per cap?

PREPARING FOR EASTER

1. Alice fills 65 Easter rabbits with jelly beans. If she has 3200 jelly beans, how many can she put in each rabbit? How many will be left over?

2. How many chocolate Easter eggs costing 15¢ each can Nora buy for \$2.00? (Write \$2.00 as 200¢.)

3. Mr. Boyd receives \$46.08 for 96 Easter lilies. How much does he get for each lily?

4. Mr. Ferris sells 72 doz. baby chicks for \$126.00. How much does he charge for each dozen chicks?

Practice until you can divide and check 5 examples like ex. 5 to 17 in 7 minutes (after copying):

- | | | |
|--------------------|----------------------|----------------------|
| 5. $6520 \div 98$ | 18. $21,780 \div 35$ | 31. $81,630 \div 39$ |
| 6. $8160 \div 34$ | 19. $10,625 \div 17$ | 32. $20,958 \div 29$ |
| 7. $3021 \div 53$ | 20. $36,769 \div 99$ | 33. $23,784 \div 87$ |
| 8. $5917 \div 97$ | 21. $22,464 \div 32$ | 34. $37,076 \div 92$ |
| 9. $4296 \div 76$ | 22. $10,918 \div 53$ | 35. $26,010 \div 51$ |
| 10. $2430 \div 31$ | 23. $30,996 \div 63$ | 36. $12,672 \div 48$ |
| 11. $4247 \div 63$ | 24. $30,444 \div 86$ | 37. $36,666 \div 56$ |
| 12. $5670 \div 21$ | 25. $25,959 \div 51$ | 38. $13,867 \div 62$ |
| 13. $3627 \div 93$ | 26. $11,661 \div 23$ | 39. $27,324 \div 66$ |
| 14. $3936 \div 96$ | 27. $35,577 \div 59$ | 40. $32,275 \div 39$ |
| 15. $4576 \div 44$ | 28. $10,148 \div 43$ | 41. $17,820 \div 22$ |
| 16. $7105 \div 35$ | 29. $24,519 \div 44$ | 42. $41,877 \div 81$ |
| 17. $1617 \div 21$ | 30. $52,730 \div 19$ | 43. $24,085 \div 59$ |

FINDING AVERAGES

1. Ed took a 4-day trip in his automobile. He drove 180 miles the first day, 210 miles the second day, 225 miles the third day, and 170 miles the last day. How many miles a day did he average?

Add the four distances to find how far he drove in all. The sum is 785 miles. Then divide 785 by 4.

$$\begin{array}{r} 180 \\ 210 \\ 225 \\ 170 \\ \hline 4 \overline{)785} \\ 196\frac{1}{4} \end{array}$$

You find that Ed averaged $196\frac{1}{4}$ miles a day.

2. Will took a 6-day trip. The distances he covered were 175 miles, 142 miles, 230 miles, 220 miles, 150 miles, and 250 miles. How many miles a day did he average?

3. Mr. Boyd is driving 3360 miles from Portland, Maine, to Seattle. He has 28 days in which to make the trip. How many miles a day must he average?

Do you have to add to find the total distance here?

4. Miss Bell added the weights of the 23 boys in Tim's class and got 1748 lb. Find the average weight per boy.

5. Jane's arithmetic marks for 5 months were as follows: 75, 85, 80, 95, 90. What was her average in arithmetic for those 5 months?

6. The 36 children in our class contributed \$22.68 toward a Fresh Air Fund. What was the average contribution of each child in the class?

HOW MUCH DID EACH BOY EARN PER DAY?

1. Last summer Bob worked 60 days and received \$180. How much did he earn per day?

To divide 180 by 60, you can cut off a zero from each number and divide 18 by 6.

$$\begin{array}{r} 60 \overline{)180} \\ 3 \end{array}$$

You find that Bob earned \$3 a day.

2. Paul worked 300 days last year and earned \$1200. How much did he earn per day?

To divide 1200 by 300, cut off both zeros from each number and then divide 12 by 3.

$$\begin{array}{r} 300 \overline{)1200} \\ 4 \end{array}$$

The quotient is 4. Hence Paul earned \$4 a day.

When the dividend and the divisor both end in 0, cut off the 0 from each and then divide.

When the dividend and the divisor both end in two 0's, cut off both 0's from each and then divide.

Exercises

Divide. Check the work by multiplying:

- | | | |
|-------------------|---------------------|----------------------|
| 1. $60 \div 30$ | 7. $880 \div 220$ | 13. $9600 \div 800$ |
| 2. $40 \div 20$ | 8. $800 \div 400$ | 14. $9120 \div 380$ |
| 3. $90 \div 30$ | 9. $600 \div 300$ | 15. $7020 \div 270$ |
| 4. $120 \div 30$ | 10. $900 \div 300$ | 16. $2640 \div 120$ |
| 5. $180 \div 90$ | 11. $1600 \div 800$ | 17. $6800 \div 1700$ |
| 6. $720 \div 120$ | 12. $1400 \div 700$ | 18. $7200 \div 2400$ |

19. How many \$30 suits can be bought for \$1200?

20. A man buys a car for \$1600 and pays \$200 a month. How long will it take to pay for it?



THREE-FIGURE DIVISORS

The children in charge of our Field Day buy 724 paper hats for \$101.36. Find the cost of 1 hat.

You must divide \$101.36 by 724. Use the same five steps which you use with a two-figure divisor.

1. To get the first quotient figure, divide 1013 by 724. Think " $10 \div 7$ gives 1." Write 1 in the quotient over 3, the last figure of the partial dividend.

2. Multiply thus: $1 \times 724 = 724$.

3. Subtract 724 from 1013, leaving 289.

4. Notice that 289 is less than 724.

$$\begin{array}{r}
 \$.14 \\
 724 \overline{) \$101.36} \\
 \underline{724} \\
 2896 \\
 \underline{2896} \\
 0
 \end{array}$$

The remainder must always be less than the divisor.

5. Bring down 6 and write it after 289, making 2896.

The next partial dividend is 2896. To find the next quotient figure, think " $28 \div 7 = 4$," and proceed as before.

Put the decimal point in the quotient over the decimal point in the dividend.

The quotient is \$.14. Hence each hat costs \$.14.

Check by multiplying.

When the second figure of the divisor is 1, 2, 3, 4, or 5, divide by the first figure of the divisor to estimate the quotient figure. (See page 37.)

DRIVING A CAR ECONOMICALLY

1. Last year Mr. Burt drove his car 5152 miles. He used 224 gal. of gasoline during the year. How many miles did he average on 1 gal. of gasoline?

2. Mr. Orr drove his car 2667 miles on 127 gal. of gasoline. How many miles per gallon did he average?

3. Mr. Law drove 9592 miles and used 436 gal. of gasoline. How many miles did he average on 1 gal.?

4. Mr. Ross used 315 gal. of gasoline and drove 7560 miles in all. How far did he average on 1 gal.?

5. Which of the men in ex. 1 to 4 drove farthest, on an average, on 1 gal. of gasoline?

Divide the following and check the work:

- | | |
|---------------------|------------------------|
| 6. $9009 \div 429$ | 18. $99,933 \div 852$ |
| 7. $9763 \div 751$ | 19. $75,969 \div 207$ |
| 8. $7872 \div 246$ | 20. $91,575 \div 429$ |
| 9. $8450 \div 338$ | 21. $15,645 \div 745$ |
| 10. $8432 \div 527$ | 22. $23,148 \div 643$ |
| 11. $9888 \div 412$ | 23. $67,769 \div 825$ |
| 12. $8918 \div 343$ | 24. $55,575 \div 741$ |
| 13. $9112 \div 536$ | 25. $26,008 \div 627$ |
| 14. $7812 \div 252$ | 26. $22,507 \div 317$ |
| 15. $8627 \div 359$ | 27. $449,506 \div 634$ |
| 16. $9697 \div 418$ | 28. $365,468 \div 847$ |
| 17. $7276 \div 428$ | 29. $224,991 \div 641$ |

THREE-FIGURE DIVISORS

Mr. Ford has a farm of 339 acres. Mr. Dick has a ranch containing 28,950 acres. Mr. Dick's ranch is how many times as large as Mr. Ford's farm?

In finding the first quotient figure, think " $28 \div 3$ gives 9." But $9 \times 339 = 3051$, which cannot be subtracted from 2895; hence 9 is too large. Try the next smaller figure, 8, as quotient. This gives a remainder of 183, which is smaller than 339; hence 8 is right.

For the second quotient figure, think " $18 \div 3 = 6$." Show why 6 is too large. Try 5 and show why it is right.

The quotient is 85 with a remainder of 135. The answer may be written as $85\frac{135}{339}$.

You see that Mr. Dick's ranch is a little over 85 times as large as Mr. Ford's farm.

$$\begin{array}{r}
 85 \\
 339 \overline{)28950} \\
 \underline{2712} \\
 1830 \\
 \underline{1695} \\
 135
 \end{array}$$

Exercises

1. Ben has 215 stamps. Ned has 2795 stamps. Ned's collection is how many times as large as Ben's?

Divide the following and check the work:

2. $8670 \div 255$

9. $\$721.27 \div 913$

3. $6132 \div 219$

10. $\$253.92 \div 552$

4. $9288 \div 344$

11. $\$408.88 \div 538$

5. $8303 \div 437$

12. $\$555.90 \div 654$

6. $8132 \div 428$

13. $\$607.38 \div 318$

7. $9968 \div 356$

14. $\$878.94 \div 257$

8. $8466 \div 249$

15. $\$801.83 \div 443$

FINDING AVERAGES

The 287 children of the Clark School have a total of \$990.30 in the school savings bank. What is the average amount in the bank for each child?

You must divide \$990.30 by 287.

As the second figure of 287 is 8, divide by 3 to estimate each quotient figure. You do this because 287 is almost 300. To get the first quotient figure, think " $9 \div 3 = 3$."

Multiplying 287 by 3, you get 861. Subtracting 861 from 990, you get 129, which is less than 287. Hence 3 is right.

For the second quotient figure, think " $12 \div 3 = 4$." 4 is right because the remainder 145 is less than 287.

For the third quotient figure, think " $14 \div 3$ gives 4." Multiplying 287 by 4, you get 1148. Subtracting 1148 from 1450, you get 302, which is larger than the divisor 287. Hence 4 is too small. Try 5. Why is 5 right?

$$\begin{array}{r}
 \$3.45 \\
 287 \overline{) \$990.30} \\
 \underline{861} \\
 1293 \\
 \underline{1148} \\
 1450 \\
 \underline{1435} \\
 15
 \end{array}$$

When the remainder is equal to or larger than the divisor, make the quotient figure 1 larger.

The answer may be written as $\$3.45\frac{15}{287}$.

The average amount per child is a little over \$3.45.

How do you check this answer? Check it.

In the work above, you estimated each quotient figure by dividing by 3, which is 1 more than the first figure of 287.

When the second figure of the divisor is 6, 7, 8, or 9, divide by 1 more than the first figure of the divisor to estimate the quotient figure. (See page 54.)

GOING AROUND THE WORLD

1. This boat makes a trip of 28,080 miles around the world in 195 days. How many miles a day does it go, on an average?

2. One year two men traveled 18,550 miles around the world in 687 hours. What was their average rate per hour? How many days and hours did the trip take?

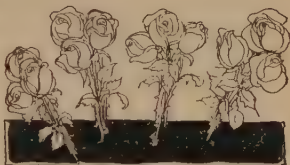


Divide the following. Check your answer :

- | | |
|-----------------------|-----------------------|
| 3. $8834 \div 398$ | 17. $91,344 \div 692$ |
| 4. $9118 \div 375$ | 18. $80,496 \div 387$ |
| 5. $9743 \div 687$ | 19. $49,310 \div 283$ |
| 6. $9245 \div 466$ | 20. $17,937 \div 577$ |
| 7. $7880 \div 394$ | 21. $11,288 \div 332$ |
| 8. $8928 \div 288$ | 22. $73,580 \div 283$ |
| 9. $7176 \div 276$ | 23. $12,150 \div 485$ |
| 10. $8597 \div 491$ | 24. $23,826 \div 418$ |
| 11. $9702 \div 462$ | 25. $11,940 \div 384$ |
| 12. $83,556 \div 396$ | 26. $99,348 \div 487$ |
| 13. $97,773 \div 897$ | 27. $47,336 \div 776$ |
| 14. $48,956 \div 379$ | 28. $41,577 \div 585$ |
| 15. $43,478 \div 194$ | 29. $39,566 \div 542$ |
| 16. $87,712 \div 896$ | 30. $34,424 \div 662$ |

FINDING PARTS OF A GROUP OF THINGS

1. May has divided these 12 roses into 4 equal bunches. What part of the 12 roses is 1 bunch? How many are $\frac{1}{4}$ of 12 roses?



2. How many are $\frac{3}{4}$ of 12 roses? To find $\frac{3}{4}$ of 12, think as follows:

$$\frac{1}{4} \text{ of } 12 = 3$$

$$\text{Hence } \frac{3}{4} \text{ of } 12 = 3 \times 3, \text{ or } 9$$

3. Find $\frac{1}{4}$ of 8. Then find $\frac{3}{4}$ of 8.

4. When you have found $\frac{1}{4}$ of a number, how do you find $\frac{3}{4}$ of the number? Find $\frac{1}{4}$ of 16; $\frac{3}{4}$ of 16.

5. Tony has 15¢. He gives $\frac{2}{3}$ of his money to his sister. To find $\frac{2}{3}$ of 15¢, think as follows:

$$\frac{1}{3} \text{ of } 15¢ = 5¢$$

$$\text{Hence } \frac{2}{3} \text{ of } 15¢ = 2 \times 5¢, \text{ or } 10¢$$

6. How do you find $\frac{2}{3}$ of a number? Find $\frac{1}{3}$ of 6¢; then find $\frac{2}{3}$ of 6¢.

State orally the answer to each of the following:

- | | | | |
|------------------------|-------------------------|-------------------------|-------------------------|
| 7. $\frac{1}{3}$ of 18 | 10. $\frac{1}{3}$ of 24 | 13. $\frac{1}{3}$ of 3 | 16. $\frac{1}{4}$ of 28 |
| $\frac{2}{3}$ of 18 | $\frac{2}{3}$ of 24 | $\frac{2}{3}$ of 3 | $\frac{3}{4}$ of 28 |
| 8. $\frac{1}{4}$ of 24 | 11. $\frac{1}{4}$ of 36 | 14. $\frac{1}{4}$ of 32 | 17. $\frac{1}{3}$ of 27 |
| $\frac{3}{4}$ of 24 | $\frac{3}{4}$ of 36 | $\frac{3}{4}$ of 32 | $\frac{2}{3}$ of 27 |
| 9. $\frac{1}{5}$ of 10 | 12. $\frac{1}{5}$ of 25 | 15. $\frac{1}{8}$ of 24 | 18. $\frac{1}{7}$ of 28 |
| $\frac{2}{5}$ of 10 | $\frac{2}{5}$ of 25 | $\frac{3}{8}$ of 24 | $\frac{2}{7}$ of 28 |
| $\frac{3}{5}$ of 10 | $\frac{4}{5}$ of 25 | $\frac{5}{8}$ of 24 | $\frac{5}{7}$ of 28 |

BUYING PARTS OF A YARD

1. How many inches are there in 1 yd.? How many inches of ribbon does Ann get if she buys $\frac{1}{4}$ yd.?

2. Lucy buys $\frac{3}{4}$ yd. of lace. How many inches of lace is that?

3. Mrs. Dorn needs $\frac{1}{2}$ yd. of velvet ribbon to trim a hat. How many inches of ribbon is that?

4. In a dry-goods store you will often find brass tacks along the edge of the counter, like this:



By these tacks the clerk measures $\frac{1}{4}$ yd., $\frac{1}{2}$ yd., etc. Draw a line 1 yd. long. Show where you would put tacks to measure $\frac{1}{4}$ yd.; $\frac{1}{2}$ yd.; $\frac{3}{4}$ yd.; 1 yd.

5. This picture shows how 1 in. is marked on your ruler. Into how many parts is the inch divided?



What part of an inch is each small space?

6. Draw lines having these lengths: $\frac{5}{8}$ in.; $\frac{7}{8}$ in.; $\frac{3}{4}$ in.; $1\frac{1}{8}$ in.; $1\frac{3}{8}$ in.; $\frac{3}{4}$ ft.; $\frac{1}{4}$ yd.

Tell what numbers should be put in place of the dots:

- | | | |
|---------------------------------|-----------------------------|--------------------------------|
| 7. $\frac{2}{3}$ ft. = .. in. | $\frac{3}{8}$ lb. = .. oz. | $\frac{3}{4}$ ton = .. lb. |
| 8. $\frac{5}{6}$ yd. = .. in. | $\frac{3}{4}$ pk. = .. qt. | $\frac{3}{4}$ hr. = .. min. |
| 9. $\frac{2}{3}$ yd. = .. ft. | $\frac{3}{4}$ gal. = .. pt. | $\frac{2}{3}$ hr. = .. min. |
| 10. $\frac{1}{2}$ ft. = .. in. | $\frac{3}{4}$ lb. = .. oz. | $\frac{5}{6}$ doz. = .. things |
| 11. $\frac{1}{2}$ gal. = .. qt. | $\frac{7}{8}$ lb. = .. oz. | $\frac{3}{4}$ doz. = .. things |

MAKING SAILS AND PENNANTS

1. Arthur made a toy sailboat. For the sail he bought $\frac{3}{4}$ yd. of canvas at 36¢ a yard. How much did the canvas cost?

To find the cost of the canvas, take $\frac{3}{4}$ of 36¢.

2. A better grade of canvas costs 48¢ a yard. How much would $\frac{3}{4}$ yd. of this canvas cost?

3. Arthur made a smaller sailboat for his little brother. For the sail he used $\frac{5}{8}$ yd. of canvas at 40¢ a yard. How much did this sail cost?

4. At 40¢ a yard, find the cost of $\frac{1}{4}$ yd. of canvas ; of $\frac{1}{2}$ yd. ; $\frac{3}{8}$ yd. ; $\frac{3}{4}$ yd. ; $\frac{7}{8}$ yd.

5. Bill bought $\frac{3}{8}$ yd. of white wool felt at \$3.20 a yard to make pennants for a launch. How much did the felt cost?

$$\begin{array}{r} 8 \overline{) \$3.20} \\ \$.40 \\ \underline{ 3} \\ \$1.20 \end{array}$$

Find $\frac{1}{8}$ of \$3.20 and then multiply the result by 3, as shown at the right.

6. He also bought $\frac{3}{8}$ yd. of red wool felt at \$2.88 a yard. How much did he pay for it?

Find the cost of each of the following :

7. $\frac{3}{4}$ yd. of heavy duck at \$1.28 a yard.

8. $\frac{5}{8}$ yd. of wool felt at \$1.36 a yard.

9. $\frac{7}{8}$ yd. of light duck at \$1.28 a yard.

10. Find $\frac{3}{8}$ of each of the following numbers :

72 64 88 208 712 904

11. Find $\frac{3}{4}$ of each of the numbers in ex. 10.

EARNING AND SAVING MONEY

1. Joe's position would pay him \$32 a month if he worked full time. He works only $\frac{3}{4}$ of the time each day. How much does he earn in a month?

2. John gets \$7.50 a week for working 6 days a week in a store. Last week he worked only 5 days. How much did he earn last week?

3. At the factory where she works, May can buy sweaters for $\frac{2}{3}$ of their regular price. How much must she pay for a sweater whose regular price is \$2.85? How much does she save on it?

4. Bill is saving to buy a pair of skates costing \$3.15. If he saves $\frac{2}{3}$ of this amount, his father will give him the rest. How much must Bill save?

5. At a sale Bob bought a pair of boots marked \$7.00 for $\frac{3}{4}$ of the marked price. How much did Bob pay for the boots? How much did he save on them?

Find the following. Check the work by going over it:

- | | | |
|--------------------------|-----------------------------|------------------------------|
| 6. $\frac{2}{5}$ of 240 | 14. $\frac{7}{8}$ of \$1.12 | 22. $\frac{3}{4}$ of \$55.64 |
| 7. $\frac{3}{4}$ of 560 | 15. $\frac{3}{4}$ of \$2.96 | 23. $\frac{5}{8}$ of \$97.60 |
| 8. $\frac{2}{3}$ of 363 | 16. $\frac{2}{3}$ of \$5.97 | 24. $\frac{3}{4}$ of \$39.64 |
| 9. $\frac{3}{8}$ of 176 | 17. $\frac{2}{5}$ of \$8.40 | 25. $\frac{2}{3}$ of \$93.21 |
| 10. $\frac{7}{8}$ of 248 | 18. $\frac{4}{5}$ of \$1.25 | 26. $\frac{5}{6}$ of \$75.54 |
| 11. $\frac{3}{4}$ of 912 | 19. $\frac{3}{8}$ of \$6.16 | 27. $\frac{3}{5}$ of \$58.95 |
| 12. $\frac{3}{5}$ of 615 | 20. $\frac{2}{3}$ of \$3.33 | 28. $\frac{2}{5}$ of \$27.70 |
| 13. $\frac{2}{3}$ of 522 | 21. $\frac{5}{8}$ of \$9.04 | 29. $\frac{7}{8}$ of \$34.00 |



MARKETING

1. Mrs. Case is marketing. She buys $3\frac{1}{4}$ lb. of almonds at 48¢ a pound. How much do they cost?

You must multiply \$.48 by $3\frac{1}{4}$.

$$\begin{array}{r} \$.48 \\ \times 3\frac{1}{4} \\ \hline 12 \\ 144 \\ \hline \$1.56 \end{array}$$

First think " $\frac{1}{4}$ of 48 = 12." Write 12 below the line so that the 2 comes under the 3. Next find 3×48 , which is 144. Write 144 under 12 so that the right-hand 4 also comes under the multiplier 3, as shown here. Then add.

How much does Mrs. Case pay for the almonds?

2. She also buys $3\frac{3}{4}$ lb. of walnuts at 48¢ a pound. How much do the walnuts cost her?

$$\begin{array}{r} \$.48 \\ \times 3\frac{3}{4} \\ \hline 36 \\ 144 \\ \hline \$1.80 \end{array}$$

Think " $\frac{3}{4}$ of 48 = 36." Write 36 under the line. Then proceed as in ex. 1.

Tell how much Mrs. Case must pay for each of these:

3. $2\frac{1}{2}$ doz. oranges at 50¢ a dozen.
4. $1\frac{1}{4}$ doz. brown eggs at 44¢ a dozen.
5. $2\frac{1}{8}$ lb. of cheese at 32¢ a pound.
6. $2\frac{3}{4}$ lb. of bacon at 40¢ a pound.

USING MIXED NUMBERS

1. Mr. Roberts worked $4\frac{1}{2}$ days last week. He earns \$6.50 a day. How much did he earn in all?

2. Alfred earns \$.48 an hour. How much did he earn last week if he worked $21\frac{3}{4}$ hr.?

Find the cost of each of the following:

3. $6\frac{7}{8}$ yd. of satin at \$1.36 a yard.

4. $12\frac{1}{2}$ yd. of linen at 98¢ a yard.

5. $4\frac{1}{2}$ yd. of cretonne at 50¢ a yard.

6. $13\frac{1}{2}$ tons of coal at \$14.50 a ton.

7. $3\frac{3}{4}$ doz. roses at \$2.80 a dozen.

8. $10\frac{3}{4}$ doz. pencils at 16¢ a dozen.

9. $3\frac{3}{4}$ oz. of nutmeg at 8¢ an ounce.

10. $2\frac{5}{8}$ lb. of fruit cake at \$1.44 a pound.

11. $3\frac{3}{8}$ lb. of stuffed dates at 40¢ a pound.

Find the following. Check the work by going over it:

12. $2\frac{1}{2} \times 20¢$ 21. $6\frac{2}{3} \times 45¢$ 30. $3\frac{7}{8} \times \$1.36$

13. $1\frac{1}{2} \times 18¢$ 22. $9\frac{1}{2} \times 86¢$ 31. $4\frac{2}{3} \times \$2.97$

14. $3\frac{1}{4} \times 48¢$ 23. $3\frac{2}{3} \times 27¢$ 32. $8\frac{3}{4} \times \$1.04$

15. $5\frac{3}{4} \times 44¢$ 24. $4\frac{5}{8} \times 64¢$ 33. $7\frac{1}{8} \times \$2.96$

16. $8\frac{1}{3} \times 84¢$ 25. $2\frac{7}{8} \times 40¢$ 34. $9\frac{7}{8} \times \$1.60$

17. $4\frac{3}{8} \times 72¢$ 26. $4\frac{5}{6} \times 42¢$ 35. $4\frac{3}{4} \times \$1.76$

18. $2\frac{3}{8} \times 48¢$ 27. $1\frac{1}{4} \times 64¢$ 36. $9\frac{1}{2} \times \$5.20$

19. $5\frac{1}{2} \times 54¢$ 28. $2\frac{2}{3} \times 51¢$ 37. $4\frac{3}{4} \times \$2.48$

20. $4\frac{5}{8} \times 56¢$ 29. $5\frac{3}{8} \times 32¢$ 38. $5\frac{1}{8} \times \$3.36$

THE TERMS OF A FRACTION

1. This circle is divided into 8 equal parts. What do you call 1 part of the circle? What do you call 3 parts? 5 parts? 7 parts?



2. If you shade 3 of the 8 parts of the circle, you have shaded $\frac{3}{8}$ of it. In the fraction $\frac{3}{8}$, 3 is called the **numerator** and 8, the **denominator**.

3 Numerator

8 Denominator

The denominator 8 shows that the whole circle has been divided into 8 equal parts. The numerator 3 shows that 3 of these parts have been taken. We call 3 and 8 the **terms** of the fraction $\frac{3}{8}$.

3. The fraction $\frac{1}{4}$ means that 1 whole thing has been divided into 4 equal parts and that 1 of these parts has been taken. What does $\frac{3}{4}$ mean?

4. Name the numerator and the denominator of each fraction and tell what the fraction means:

$\frac{1}{8}$

$\frac{7}{8}$

$\frac{1}{2}$

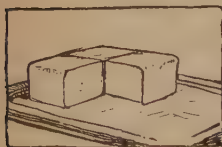
$\frac{1}{3}$

$\frac{2}{3}$

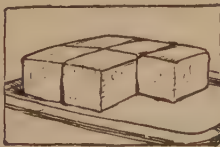
$\frac{3}{5}$

$\frac{1}{7}$

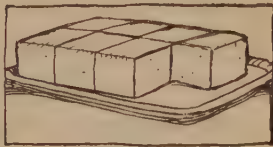
$\frac{5}{8}$



A



B

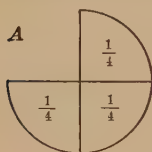


C

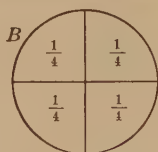
5. Study pictures A, B, and C. Then write the fraction that tells what part of each cake is left.

PROPER AND IMPROPER FRACTIONS

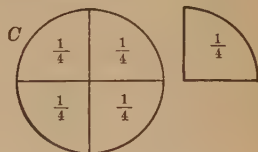
1. In Figure *A*, you see that $\frac{3}{4}$ of a circle is less than 1 whole circle. Hence $\frac{3}{4}$ is less than 1. Compare the numerator of $\frac{3}{4}$ with the denominator.



$\frac{3}{4}$ is less than 1.



$\frac{4}{4}$ equals 1.



$\frac{5}{4}$ is more than 1.

2. In Figure *B*, you see that it takes 4 fourths of a circle to make 1 whole circle. Hence $\frac{4}{4} = 1$. Compare the numerator and the denominator of $\frac{4}{4}$.

3. Figure *C* shows a whole circle and $\frac{1}{4}$ of another circle. How many fourths of a circle are there in all? Is $\frac{5}{4}$ more or less than 1? How does the numerator of $\frac{5}{4}$ compare with the denominator?

4. Compare $\frac{7}{8}$ of a circle with a whole circle; $\frac{9}{8}$ of a circle with a whole circle.

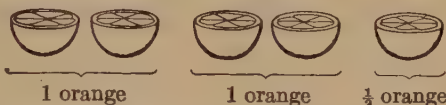
5. Fractions like $\frac{3}{4}$ and $\frac{7}{8}$, in which the numerator is *less than* the denominator, are called **proper fractions**. A proper fraction is always less than 1.

6. Fractions like $\frac{4}{4}$, $\frac{8}{8}$, $\frac{5}{4}$, and $\frac{9}{8}$, in which the numerator is *equal to* or *more than* the denominator, are called **improper fractions**. Improper fractions are either equal to or greater than 1.

7. Which fractions are less than 1? more than 1? equal to 1? $\frac{5}{8}$ $\frac{5}{4}$ $\frac{6}{6}$ $\frac{7}{2}$ $\frac{9}{4}$ $\frac{1}{5}$ $\frac{4}{4}$

REDUCING IMPROPER FRACTIONS

1. Mrs. Brown serves 5 half oranges for breakfast. How many whole oranges and half oranges is that?



You see that 5 half oranges are equal to $2\frac{1}{2}$ oranges. Hence $\frac{5}{2} = 2\frac{1}{2}$.

A short way to find that $\frac{5}{2} = 2\frac{1}{2}$ is to divide 5 by 2.

2. Draw a line 7 quarter inches long. How many whole inches and quarter inches are $\frac{7}{4}$ inches?

$$\begin{array}{r} 4 \overline{)7} \\ 1\frac{3}{4} \end{array}$$

You can also change $\frac{7}{4}$ in. to $1\frac{3}{4}$ in. by dividing 7 by 4, as above.

3. A number like 1, 7, or 13 is a **whole number**. A number like $2\frac{1}{2}$ or $1\frac{3}{4}$, made up of a whole number and a fraction, is called a **mixed number**.

To change an improper fraction to a whole number or to a mixed number, divide the numerator by the denominator.

Exercises

1. Mary has 7 boxes of candy, each weighing $\frac{1}{2}$ lb. How many pounds of candy are $\frac{7}{2}$ lb.?

2. Ida used $\frac{1}{4}$ yd. of ribbon for each of 9 badges. How many yards did she use in all? How many yards are $\frac{9}{4}$ yd.?

Change the following to whole or to mixed numbers:

3. $\frac{5}{4}$

6. $\frac{11}{8}$

9. $\frac{13}{8}$

12. $\frac{5}{3}$

15. $\frac{17}{8}$

4. $\frac{6}{2}$

7. $\frac{6}{5}$

10. $\frac{7}{3}$

13. $\frac{12}{4}$

16. $\frac{16}{8}$

5. $\frac{8}{4}$

8. $\frac{3}{2}$

11. $\frac{7}{6}$

14. $\frac{15}{8}$

17. $\frac{11}{4}$

ADDING FRACTIONS WITH THE SAME NAME

1. When you add things, they must always have the *same name*. You can add 3 tops and 4 tops and get 7 tops; but you cannot add 3 tops and 4 chairs, because they are not the same kind of things.

2. Which of these can you add? Tell why.

3 boys	2 cents	6 apples	6 wagons
<u>2 hats</u>	<u>5 cents</u>	<u>4 apples</u>	<u>5 houses</u>

3. Every fraction has a name, just like any other thing. Its denominator tells its name. In $\frac{3}{8}$, the denominator shows that the name of the fraction is *eighths*. The numerator, 3, tells *how many eighths* there are. You can add 3 *eighths* and 4 *eighths* because they both have the same name; the sum is 7 *eighths*. Hence you see that $\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$. Do the work as shown at the right.

<i>Think this:</i>	<i>Write this:</i>
3 eighths	$\frac{3}{8}$
4 eighths	$\frac{4}{8}$
<u>7 eighths</u>	$\frac{7}{8}$

4. Can these be added? If they can, add them:

1 third	$\frac{1}{3}$	3 eighths	$\frac{3}{8}$	1 fourth	$\frac{1}{4}$
<u>1 third</u>	<u>$\frac{1}{3}$</u>	<u>2 eighths</u>	<u>$\frac{2}{8}$</u>	<u>2 fourths</u>	<u>$\frac{2}{4}$</u>

Tell the name of each fraction, and add:

5. $\frac{5}{8}$	6. $\frac{1}{8}$	7. $\frac{3}{6}$	8. $\frac{2}{4}$	9. $\frac{1}{3}$	10. $\frac{6}{8}$
<u>$\frac{2}{8}$</u>	<u>$\frac{2}{8}$</u>	<u>$\frac{2}{6}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{8}$</u>	<u>$\frac{1}{8}$</u>

1. Mary had $\frac{5}{8}$ yd. of ribbon and Alice gave her $\frac{3}{4}$ yd. more. How much ribbon did Mary have then?

Hence Mary had in all $\frac{8}{8}$ yd. of ribbon, which is equal to 1 whole yard.

$$\frac{\frac{5}{8} \times \frac{3}{8}}{\frac{3}{8}} = 1$$

$$\begin{array}{r} \frac{2}{4} \\ \frac{3}{4} \\ \hline \frac{5}{4} = 1\frac{1}{4} \end{array}$$

You see that $\frac{2}{4} + \frac{3}{4} = \frac{5}{4}$. Changing $\frac{5}{4}$ to $1\frac{1}{4}$, you find that Lewis ate $1\frac{1}{4}$ apples in all.

1. Mrs. Hoyt bought $\frac{1}{4}$ lb. of tea on Monday and $\frac{3}{4}$ lb. of tea on Tuesday. How much tea did she buy both days?

2. Ann's blouse is to have a hem $\frac{7}{8}$ in. wide, and $\frac{2}{8}$ in. extra is to be allowed for turning in the edge. How much must Ann allow for the hem?

3. Bob has $\frac{1}{8}$ lb. of copper wire. He buys $\frac{7}{8}$ lb. more. How much copper wire has he then?

Add these. Change improper fractions in the answers to whole numbers or to mixed numbers:

4. $\frac{9}{8}$ 6. $\frac{3}{5}$ 8. $\frac{2}{3}$ 10. $\frac{7}{8}$ 12. $\frac{2}{3}$ 14. $\frac{2}{5}$ 16. $\frac{7}{8}$

$\frac{7}{8}$ $\frac{2}{5}$ $\frac{2}{3}$ $\frac{4}{8}$ $\frac{1}{3}$ $\frac{4}{5}$ $\frac{2}{8}$

5. $\frac{5}{4}$ 7. $\frac{4}{8}$ 9. $\frac{1}{2}$ 11. $\frac{5}{6}$ 13. $\frac{7}{8}$ 15. $\frac{3}{4}$ 17. $\frac{3}{2}$

$\frac{2}{4}$ $\frac{5}{8}$ $\frac{1}{2}$ $\frac{1}{6}$ $\frac{6}{8}$ $\frac{2}{4}$ $\frac{1}{2}$

ADDING MIXED NUMBERS

1. Doris walked $3\frac{1}{2}$ miles to visit a friend. Then she walked home again. How far did she walk in all?



To find out, write $3\frac{1}{2}$ under $3\frac{1}{2}$. Then think " $\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$, or 1." Carry this 1 to the whole numbers.

$$\begin{array}{r} 3\frac{1}{2} \\ 3\frac{1}{2} \\ \hline 7 \end{array}$$

Then think " $1 \text{ (carried)} + 3 + 3 = 7$." Doris walked 7 miles.

2. George walked $1\frac{1}{2}$ miles on Monday, $2\frac{1}{2}$ miles on Tuesday, and $3\frac{1}{2}$ miles on Wednesday. How far did he walk in all?

To find out, write the numbers as shown here.

Think " $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2}$, or $1\frac{1}{2}$." Write $\frac{1}{2}$ and carry 1.

Then think " $1 \text{ (carried)} + 3 + 2 + 1 = 7$."

You find that George walked $7\frac{1}{2}$ miles in all.

$$\begin{array}{r} 1\frac{1}{2} \\ 2\frac{1}{2} \\ 3\frac{1}{2} \\ \hline 7\frac{1}{2} \end{array}$$

Exercises

1. Allen buys $1\frac{1}{2}$ lb. of rice and $7\frac{1}{2}$ lb. of flour for his mother. How much do both packages weigh?

2. Mrs. Bond wants $2\frac{1}{4}$ yd. of cretonne for curtains, $2\frac{3}{4}$ yd. for a couch cover, and $1\frac{1}{4}$ yd. for a cushion. How many yards of cretonne should she buy?

Add. Check the work by going over it again:

3. $2\frac{1}{2}$
5 $\frac{1}{2}$

4. $3\frac{3}{4}$
2 $\frac{1}{4}$

5. $4\frac{5}{8}$
3 $\frac{3}{8}$

6. $7\frac{2}{4}$
1 $\frac{3}{4}$

7. $6\frac{2}{3}$
3 $\frac{2}{3}$

KEEPING TRACK OF THE TIME

1. One evening Louise spent $1\frac{1}{4}$ hr. doing her homework and $\frac{3}{4}$ of an hour practicing her music. How much time did these lessons take her?

2. To-day Joe spent $\frac{1}{2}$ hr. on his arithmetic homework, $\frac{1}{2}$ hr. on his grammar, and $\frac{1}{2}$ hr. on his geography. How much time did he spend in all?

3. Arthur works for Mr. Adams. Last week he worked $1\frac{1}{4}$ hr., $2\frac{1}{4}$ hr., and $1\frac{3}{4}$ hr. How many hours did he work in all?

4. In making candy for a party, Ruth used $\frac{3}{4}$ lb. of sugar on Monday, $2\frac{1}{4}$ lb. on Tuesday, and $\frac{3}{4}$ lb. on Wednesday. How much sugar did she use in all?

Exercises

Add. Check the work by going over it again:

$$\begin{array}{r} 1. \quad 2\frac{1}{3} \\ \quad 3\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 2\frac{1}{4} \\ \quad 9\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 2\frac{3}{4} \\ \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 4\frac{1}{3} \\ \quad 3\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 3\frac{1}{8} \\ \quad 4\frac{7}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 9\frac{5}{6} \\ \quad 5\frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 7\frac{7}{8} \\ \quad 4\frac{4}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 9\frac{1}{6} \\ \quad 1\frac{4}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 4\frac{2}{3} \\ \quad 5\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 8\frac{1}{8} \\ \quad 6\frac{7}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 2\frac{1}{2} \\ \quad 3\frac{1}{2} \\ \quad 1\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 1\frac{1}{4} \\ \quad 4\frac{3}{4} \\ \quad 2\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 4\frac{3}{8} \\ \quad 5\frac{1}{8} \\ \quad 2\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 3\frac{3}{4} \\ \quad 2\frac{1}{4} \\ \quad 4\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 4\frac{1}{2} \\ \quad 3 \\ \quad 2\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 5\frac{1}{2} \\ \quad 7\frac{1}{2} \\ \quad 4\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 4\frac{1}{4} \\ \quad 9\frac{3}{4} \\ \quad 6\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 3\frac{5}{6} \\ \quad 3\frac{1}{6} \\ \quad 4\frac{5}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 8\frac{1}{3} \\ \quad 4\frac{2}{3} \\ \quad 6\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 5\frac{1}{8} \\ \quad 9 \\ \quad 4\frac{7}{8} \\ \hline \end{array}$$

HALVES AND FOURTHS

1. How many quarters of a dollar make half a dollar? Is $\$ \frac{2}{4}$ exactly equal to $\$ \frac{1}{2}$?



2. One half of this circle is shaded. How many quarters of a circle are there in half of the circle? Since $\frac{2}{4}$ of a circle is the same as $\frac{1}{2}$ of the circle, $\frac{2}{4} = \frac{1}{2}$.

Since $\frac{1}{2}$ and $\frac{2}{4}$ both have the same value, you can always change $\frac{1}{2}$ to $\frac{2}{4}$ or you can change $\frac{2}{4}$ to $\frac{1}{2}$ when it will help you in working a problem.

3. Remember these: $\frac{1}{2} = \frac{2}{4}$ $\frac{2}{4} = \frac{1}{2}$

4. Joan has $\frac{3}{4}$ lb. of candy in one box and $\frac{1}{2}$ lb. in another box. How much candy has she in all?

Joan cannot add 3 *fourths* and 1 *half* because they have different names. But if she changes $\frac{1}{2}$ to $\frac{2}{4}$, she can add 3 *fourths* and 2 *fourths*, because they then have the same name. Adding $\frac{3}{4}$ and $\frac{2}{4}$, Joan gets $\frac{5}{4}$, which equals $1\frac{1}{4}$.

$$\begin{aligned}\frac{3}{4} &= \frac{3}{4} \\ \frac{1}{2} &= \frac{2}{4} \\ \frac{5}{4} &= 1\frac{1}{4}\end{aligned}$$

Joan has $1\frac{1}{4}$ lb. of candy in all.

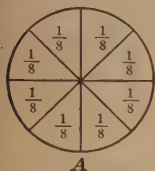
5. Ben studied $\frac{1}{4}$ hr. this afternoon and $\frac{1}{2}$ hr. this evening. How long did he study to-day?

Add these. Arrange the work as in ex. 4 above:

- | | | | | |
|---|---|---|--|--|
| 6. $\frac{1}{2}$
<u>$\frac{3}{4}$</u> | 7. $\frac{2}{4}$
<u>$\frac{1}{2}$</u> | 8. $\frac{1}{2}$
<u>$\frac{5}{4}$</u> | 9. $2\frac{1}{2}$
<u>$3\frac{1}{4}$</u> | 10. $6\frac{1}{2}$
<u>$5\frac{3}{4}$</u> |
| 11. $\frac{1}{2}$
<u>$\frac{1}{2}$</u>
<u>$\frac{1}{4}$</u> | 12. $\frac{1}{2}$
<u>$\frac{1}{4}$</u>
<u>$\frac{1}{4}$</u> | 13. $\frac{1}{4}$
<u>$\frac{3}{4}$</u>
<u>$\frac{1}{2}$</u> | 14. $2\frac{1}{2}$
<u>$2\frac{1}{2}$</u>
<u>$3\frac{3}{4}$</u> | 15. $6\frac{3}{4}$
<u>$2\frac{1}{4}$</u>
<u>$1\frac{1}{2}$</u> |

COMPARING HALVES, FOURTHS, AND EIGHTHS

1. Circle *A* is divided into 8 equal parts. Since 8 eighths of a circle make a whole circle, $\frac{8}{8} = 1$.



2. Shade $\frac{1}{4}$ of a circle, as in *B*. How many eighths of a circle make $\frac{1}{4}$ of a circle? This shows that $\frac{1}{4} = \frac{2}{8}$.

3. Shade $\frac{1}{2}$ of a circle, as in *C*. How many eighths of a circle make $\frac{1}{2}$ of a circle? This shows that $\frac{1}{2} = \frac{4}{8}$.

4. Shade $\frac{3}{4}$ of a circle, as in *D*. How many eighths of a circle make $\frac{3}{4}$ of a circle? This shows that $\frac{3}{4} = \frac{6}{8}$.

5. Since $\frac{3}{4} = \frac{6}{8}$, you can change $\frac{3}{4}$ to $\frac{6}{8}$ or change $\frac{6}{8}$ to $\frac{3}{4}$. You can also change $\frac{1}{2}$ to $\frac{4}{8}$ and $\frac{1}{4}$ to $\frac{2}{8}$.

6. Remember the following:

$$\frac{1}{4} = \frac{2}{8}$$

$$\frac{1}{2} = \frac{4}{8}$$

$$\frac{3}{4} = \frac{6}{8}$$

$$\frac{2}{8} = \frac{1}{4}$$

$$\frac{4}{8} = \frac{1}{2}$$

$$\frac{6}{8} = \frac{3}{4}$$

Exercises

1. On your ruler show how long $\frac{3}{4}$ of an inch is. Show how long $\frac{6}{8}$ of an inch is. Does $\frac{3}{4}$ in. = $\frac{6}{8}$ in.?

2. On your ruler show that $\frac{1}{4}$ in. equals $\frac{2}{8}$ in. Also show that $\frac{1}{2}$ in. equals $\frac{2}{4}$ in. or $\frac{4}{8}$ in.

3. May said that she had $\frac{6}{8}$ of a yard of ribbon. Say this in another way.

A SHORT WAY TO CHANGE $\frac{3}{4}$ TO $\frac{6}{8}$

1. By dividing a circle into parts, you have just learned that $\frac{3}{4}$ and $\frac{6}{8}$ have the same value. Hence, in working problems, $\frac{3}{4}$ may be changed to $\frac{6}{8}$.

2. A quick way to change $\frac{3}{4}$ to $\frac{6}{8}$ is to multiply both terms of $\frac{3}{4}$ by 2, in this way:

$$\frac{3 \times 2}{4 \times 2} = \frac{6}{8}$$

3. Similarly, a quick way to change $\frac{1}{2}$ to $\frac{4}{8}$ is to multiply both terms of $\frac{1}{2}$ by 4, as shown below:

$$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$$

4. By what number do you multiply both terms of $\frac{1}{4}$ to change $\frac{1}{4}$ to $\frac{2}{8}$? Have $\frac{1}{4}$ and $\frac{2}{8}$ the same value?

If you multiply both terms of a fraction by the same number, you get another fraction with the same value.

Exercises

In each problem, tell what number should be put in place of the star so that both fractions will have the same value:

1. $\frac{1}{2} = \frac{*}{4}$	$\frac{2}{4} = \frac{*}{8}$	$\frac{1}{2} = \frac{*}{8}$	$\frac{1}{4} = \frac{*}{8}$	$\frac{3}{5} = \frac{*}{10}$
2. $\frac{1}{3} = \frac{*}{6}$	$\frac{2}{3} = \frac{*}{6}$	$\frac{1}{2} = \frac{*}{6}$	$\frac{3}{4} = \frac{*}{12}$	$\frac{2}{3} = \frac{*}{12}$

3. By what number should you multiply both terms of $\frac{1}{2}$ to change $\frac{1}{2}$ to $\frac{5}{10}$?

REDUCING A FRACTION TO LOWEST TERMS

1. You have learned that you can change $\frac{3}{4}$ to $\frac{6}{8}$ by multiplying both terms of $\frac{3}{4}$ by 2. If you wish to change $\frac{6}{8}$ back to $\frac{3}{4}$, you can do so by dividing both terms of $\frac{6}{8}$ by 2, as shown below :

$$\frac{6 \div 2}{8 \div 2} = \frac{3}{4}$$

2. Likewise you can change $\frac{4}{8}$ to $\frac{1}{2}$ by dividing both terms of $\frac{4}{8}$ by 4, as shown here :

$$\frac{4 \div 4}{8 \div 4} = \frac{1}{2}$$

If you divide both terms of a fraction by the same number, you get another fraction with the same value.

3. What fraction do you get when you divide both terms of $\frac{4}{8}$ by 2?

When you change $\frac{4}{8}$ to $\frac{2}{4}$, you reduce $\frac{4}{8}$ to *lower terms*; but when you change $\frac{4}{8}$ to $\frac{1}{2}$, you reduce $\frac{4}{8}$ to its *lowest terms* because $\frac{1}{2}$ cannot be reduced further.

To reduce a fraction to lowest terms, divide the terms by the largest number that will divide both terms exactly.

Exercises

1. Reduce each fraction to lowest terms :

$$\frac{2}{8} \quad \frac{2}{10} \quad \frac{2}{4} \quad \frac{2}{6} \quad \frac{3}{6} \quad \frac{4}{6} \quad \frac{2}{12} \quad \frac{4}{12} \quad \frac{3}{9}$$

2. Sarah says, "I have $\frac{6}{8}$ of a yard of crêpe paper." In what other way could Sarah say this?

ADDING EIGHTHS

Nora buys $\frac{1}{8}$ lb. of cinnamon and $\frac{1}{8}$ lb. of cloves. How much do both weigh?

The sum of $\frac{1}{8}$ and $\frac{1}{8}$ is $\frac{2}{8}$, which can be reduced to $\frac{1}{4}$. Both together weigh $\frac{1}{4}$ lb.

Check the work by going over it again.

Always reduce the fraction in the answer to its lowest terms.

$$\frac{\frac{1}{8}}{\frac{2}{8}} = \frac{1}{4}$$

Exercises

1. John has $\frac{3}{8}$ lb. of copper wire. If he buys $\frac{1}{8}$ lb. more, how much will he then have?

2. Draw a line $\frac{3}{8}$ in. long. Add $\frac{3}{8}$ in. to it. How long is the line then?

3. Ruth has $\frac{1}{4}$ lb. of almonds and $\frac{1}{4}$ lb. of butter-nuts. How much do all the nuts weigh?

4. Fred walks $\frac{3}{8}$ mile to Joe's house. Then he walks $\frac{5}{8}$ mile more to the pond. How far does he walk in all?

Add, reducing all fractions in the answers to lowest terms. Check the work by going over it again:

$$5. \quad \frac{\frac{2}{8}}{\frac{2}{8}}$$

$$8. \quad \frac{\frac{1}{8}}{\frac{3}{8}}$$

$$11. \quad \frac{\frac{3}{4}}{\frac{3}{4}}$$

$$14. \quad \frac{1\frac{3}{8}}{1\frac{1}{8}}$$

$$17. \quad \frac{3\frac{3}{8}}{2\frac{5}{8}}$$

$$6. \quad \frac{\frac{3}{8}}{\frac{3}{8}}$$

$$9. \quad \frac{\frac{5}{8}}{\frac{1}{8}}$$

$$12. \quad \frac{\frac{7}{8}}{\frac{7}{8}}$$

$$15. \quad \frac{4\frac{1}{4}}{3\frac{1}{4}}$$

$$18. \quad \frac{5\frac{3}{8}}{3\frac{7}{8}}$$

$$7. \quad \frac{\frac{1}{4}}{\frac{1}{4}}$$

$$10. \quad \frac{\frac{2}{8}}{\frac{4}{8}}$$

$$13. \quad \frac{\frac{5}{8}}{\frac{5}{8}}$$

$$16. \quad \frac{8\frac{1}{8}}{2\frac{5}{8}}$$

$$19. \quad \frac{4\frac{5}{8}}{3\frac{7}{8}}$$

ADDING HALVES, FOURTHS, AND EIGHTHS

1. Ida buys $\frac{3}{4}$ yd. of red silk and $\frac{3}{8}$ yd. of blue silk for a flag. How much silk does she buy?

You know that you can add only things that have the same name. You cannot add $\frac{3}{4}$ and $\frac{3}{8}$, as they stand, because 3 *fourths* and 3 *eighths* have different names. But $\frac{3}{4} = \frac{6}{8}$; hence you can change $\frac{3}{4}$ to $\frac{6}{8}$.

$$\begin{array}{r} \frac{3}{4} = \frac{6}{8} \\ \frac{3}{8} = \frac{3}{8} \\ \hline \frac{9}{8} = 1\frac{1}{8} \end{array}$$

Have $\frac{6}{8}$ and $\frac{3}{8}$ the same name? How many eighths are 6 *eighths* and 3 *eighths*?

Ida buys $\frac{9}{8}$ yd. of silk, which equals $1\frac{1}{8}$ yd.

2. Rose has $\frac{7}{8}$ lb. of butter. She buys $\frac{1}{2}$ lb. more. How much butter has she then?

Do $\frac{1}{2}$ and $\frac{7}{8}$ have the same name? Change $\frac{1}{2}$ to $\frac{4}{8}$. Can you add now?

$$\begin{array}{r} \frac{1}{2} = \frac{4}{8} \\ \frac{7}{8} = \frac{7}{8} \\ \hline \frac{11}{8} = 1\frac{3}{8} \end{array}$$

To add fourths and eighths, change the fourths to eighths. To add halves and eighths, change the halves to eighths.

Exercises

Add. In the answers reduce improper fractions to mixed numbers, and other fractions to lowest terms:

1. $\frac{1}{8}$
 $\frac{1}{2}$

2. $\frac{1}{2}$
 $\frac{3}{8}$

3. $\frac{1}{4}$
 $\frac{5}{8}$

4. $\frac{5}{8}$
 $\frac{1}{2}$

5. $\frac{5}{8}$
 $\frac{3}{4}$

6. $\frac{1}{8}$
 $\frac{3}{4}$

7. $\frac{1}{4}$
 $\frac{3}{8}$

8. $\frac{7}{8}$
 $\frac{1}{4}$

9. $\frac{1}{2}$
 $\frac{3}{4}$

10. $\frac{1}{2}$
 $\frac{1}{4}$

11. $\frac{5}{8}$
 $\frac{1}{4}$
 $\frac{1}{8}$

12. $\frac{7}{8}$
 $\frac{1}{4}$
 $\frac{3}{8}$

13. $\frac{1}{8}$
 $\frac{1}{2}$
 $\frac{5}{8}$

14. $\frac{7}{8}$
 $\frac{3}{4}$
 $\frac{5}{8}$

15. $\frac{3}{8}$
 $\frac{1}{4}$
 $\frac{1}{8}$

USING MIXED NUMBERS

Harry works at the market on Saturdays. Last Saturday he delivered to Mrs. Dane a chicken weighing $4\frac{1}{2}$ lb. and $2\frac{5}{8}$ lb. of steak. How much in all did this meat weigh?

Write $2\frac{5}{8}$ under $4\frac{1}{2}$. Change $4\frac{1}{2}$ to $4\frac{4}{8}$. Then think " $\frac{5}{8} + \frac{4}{8} = \frac{9}{8}$, or $1\frac{1}{8}$." Write $\frac{1}{8}$ under the line and carry 1.

$$\begin{array}{r} 4\frac{1}{2} = 4\frac{4}{8} \\ 2\frac{5}{8} = 2\frac{5}{8} \\ \hline 7\frac{1}{8} \end{array}$$

Think "1 (carried) + 2 + 4 = 7." Write 7.

Mrs. Dane's meat weighed $7\frac{1}{8}$ lb.

Exercises

Arrange the work in each problem as shown above.

1. Harry delivered $7\frac{1}{2}$ lb. of roast beef and $1\frac{3}{4}$ lb. of lamb chops to Mrs. Law. How much did that bundle weigh?

2. How much do $4\frac{1}{2}$ lb. of leg of lamb and $1\frac{3}{8}$ lb. of bacon weigh?

Add. Check the work by going over it again:

$$\begin{array}{r} 3. \quad 2\frac{3}{4} \\ \quad 8\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 7\frac{3}{8} \\ \quad 8\frac{7}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 2\frac{7}{8} \\ \quad 4\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 4\frac{5}{8} \\ \quad 2\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 2\frac{3}{8} \\ \quad 4\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 7\frac{1}{2} \\ \quad 3\frac{1}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 2\frac{1}{4} \\ \quad 9\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 5\frac{7}{8} \\ \quad 2\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 8\frac{3}{4} \\ \quad 2\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 6\frac{1}{2} \\ \quad 8\frac{7}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 2\frac{1}{8} \\ \quad 2\frac{1}{4} \\ \quad 3\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 1\frac{1}{8} \\ \quad 8\frac{3}{4} \\ \quad 2\frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 9\frac{5}{8} \\ \quad 4\frac{3}{4} \\ \quad 2\frac{1}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 7\frac{1}{2} \\ \quad 6\frac{3}{8} \\ \quad 2\frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 1\frac{3}{8} \\ \quad 5\frac{3}{4} \\ \quad 2\frac{5}{8} \\ \hline \end{array}$$

REVIEW OF ADDITION

Copy and add the following. Check the work:

1. 14	2. 42	3. 46	4. 82	5. 23	6. 97
86	85	21	68	20	79
27	39	58	16	53	33
34	78	94	61	13	67
70	86	29	76	95	80
75	34	30	50	29	51
56	20	77	99	38	78
51	95	15	45	94	60
97	46	29	30	18	14
<u>79</u>	<u>76</u>	<u>89</u>	<u>69</u>	<u>42</u>	<u>61</u>

Add without copying. Practice until you can do and check 4 of the following examples in 8 minutes:

7. 7047	8. 2468	9. 1624	10. 5862
9530	8599	2184	6323
6985	3334	5956	3876
1229	6400	1736	9792
5803	4959	4102	5518
7756	9757	3840	1703
<u>8688</u>	<u>6238</u>	<u>8848</u>	<u>7410</u>
11. 9972	12. 2467	13. 4242	14. 2247
2384	9601	3256	5304
6130	7094	9798	8943
1051	9936	1053	8726
8787	2370	1224	7408
6714	1155	4803	9615
<u>9688</u>	<u>8538</u>	<u>9630</u>	<u>3090</u>

REVIEW OF SUBTRACTION

1. The population of Lakeville was 26,700 one year and 23,483 ten years later. How much less was the population in the later year than in the earlier year?'

2. On a certain railroad the distance from Chicago to Omaha is 488 miles, while from Chicago to San Francisco it is 2261 miles. On a trip from Chicago to San Francisco, how many miles farther do you have to travel after you reach Omaha?

3. Mr. Lane bought a house for \$15,000, on which he paid \$4750 in cash. How much did he still owe?

Subtract without copying. Practice until you can do and check 6 of the following examples in 5 minutes :

$$\begin{array}{r} 4. \ \$8844.61 \\ \quad 970.78 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \ \$6689.12 \\ \quad 704.64 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \ \$5344.43 \\ \quad 742.59 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \ \$3611.90 \\ \quad 677.33 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \ \$6831.10 \\ \quad 685.30 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \ \$1616.38 \\ \quad 199.46 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \ \$8506.72 \\ \quad 1524.89 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \ \$8490.19 \\ \quad 2879.40 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \ \$8519.51 \\ \quad 2251.99 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \ \$9828.33 \\ \quad 7735.68 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \ \$4918.23 \\ \quad 1523.66 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \ \$6700.00 \\ \quad 5332.15 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \ \$6361.93 \\ \quad 2998.63 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \ \$9404.89 \\ \quad 5736.92 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \ \$6000.00 \\ \quad 3415.45 \\ \hline \end{array}$$

SUBTRACTING FRACTIONS WITH LIKE NAMES

1. You have seen that you can add fractions that have the same denominator. You can also subtract fractions that have the same denominator.

2. Will has $\frac{3}{4}$ of an apple. He gives $\frac{1}{4}$ of the apple to Roy. How many fourths of the apple has Will left?

To find $\frac{3}{4} - \frac{1}{4}$, think of $\frac{3}{4}$ as 3 *fourths* and think of $\frac{1}{4}$ as 1 *fourth*. Then think " $\frac{1}{4}$ and $\frac{2}{4} = \frac{3}{4}$." Write $\frac{2}{4}$ below the line. Then reduce $\frac{2}{4}$ to $\frac{1}{2}$.

Will has $\frac{1}{2}$ of the apple left.

<i>Think this:</i>	<i>Write this:</i>
3 fourths	$\frac{3}{4}$
1 fourth	$\frac{1}{4}$
2 fourths	$\frac{2}{4}$, or $\frac{1}{2}$

Exercises

1. Can you subtract these? If so, do it.

5 eighths	$\frac{5}{8}$	3 fourths	$\frac{3}{4}$	7 eighths	$\frac{7}{8}$
<u>2 eighths</u>	<u>$\frac{2}{8}$</u>	<u>2 fourths</u>	<u>$\frac{2}{4}$</u>	<u>6 eighths</u>	<u>$\frac{6}{8}$</u>

2. If you buy $\frac{5}{8}$ yd. of ribbon and use $\frac{1}{8}$ yd. of it, what part of a yard is left?

Subtract. Reduce all answers to their lowest terms:

3. $\frac{2}{4}$	5. $\frac{4}{8}$	7. $\frac{4}{4}$	9. $\frac{7}{8}$	11. $\frac{8}{8}$	13. $\frac{5}{4}$
<u>$\frac{1}{4}$</u>	<u>$\frac{3}{8}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{8}$</u>	<u>$\frac{5}{8}$</u>	<u>$\frac{3}{4}$</u>
4. $\frac{7}{8}$	6. $\frac{7}{8}$	8. $\frac{5}{8}$	10. $\frac{7}{8}$	12. $\frac{13}{8}$	14. $\frac{2}{2}$
<u>$\frac{4}{8}$</u>	<u>$\frac{5}{8}$</u>	<u>$\frac{1}{8}$</u>	<u>$\frac{3}{8}$</u>	<u>$\frac{7}{8}$</u>	<u>$\frac{1}{2}$</u>

15. What must you add to each of these fractions to make 1? (Think of 1 as $\frac{2}{2}$ or $\frac{3}{3}$ or $\frac{4}{4}$ or $\frac{8}{8}$.)

$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{6}{8}$
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COMPARING WEIGHTS

1. Howard and Dan are standing on the scales together. They weigh $146\frac{3}{4}$ lb. Dan alone weighs $81\frac{1}{4}$ lb. How heavy is Howard?



2. Bob weighs $73\frac{5}{8}$ lb. His brother Gus weighs $75\frac{7}{8}$ lb. Which boy is heavier? how much heavier?

3. The average weight of the children in John's class is $71\frac{1}{4}$ lb. John weighs $72\frac{3}{4}$ lb. How much above the average weight is John?

4. Martin is in John's class. His weight is $4\frac{1}{4}$ lb. below the average weight of the class (see ex. 3). Find Martin's weight.

5. Edward is in John's class. He weighs $85\frac{3}{4}$ lb. How much above the average does he weigh?

Subtract. Check the work by going over it again:

$$\begin{array}{r} 6. \quad 4\frac{5}{8} \\ \underline{2\frac{1}{8}} \end{array}$$

$$\begin{array}{r} 9. \quad 8\frac{2}{3} \\ \underline{3\frac{1}{3}} \end{array}$$

$$\begin{array}{r} 12. \quad 2\frac{3}{8} \\ \underline{1\frac{1}{8}} \end{array}$$

$$\begin{array}{r} 15. \quad 8\frac{1}{2} \\ \underline{7\frac{1}{2}} \end{array}$$

$$\begin{array}{r} 18. \quad 7\frac{1}{4} \\ \underline{1\frac{1}{4}} \end{array}$$

$$\begin{array}{r} 7. \quad 6\frac{3}{8} \\ \underline{5\frac{2}{8}} \end{array}$$

$$\begin{array}{r} 10. \quad 9\frac{3}{4} \\ \underline{7\frac{1}{4}} \end{array}$$

$$\begin{array}{r} 13. \quad 4\frac{1}{4} \\ \underline{2} \end{array}$$

$$\begin{array}{r} 16. \quad 6\frac{7}{8} \\ \underline{3\frac{1}{8}} \end{array}$$

$$\begin{array}{r} 19. \quad 3\frac{5}{8} \\ \underline{2\frac{3}{8}} \end{array}$$

$$\begin{array}{r} 8. \quad 5\frac{3}{4} \\ \underline{2\frac{2}{4}} \end{array}$$

$$\begin{array}{r} 11. \quad 6\frac{5}{8} \\ \underline{2\frac{2}{8}} \end{array}$$

$$\begin{array}{r} 14. \quad 7\frac{6}{8} \\ \underline{2\frac{3}{8}} \end{array}$$

$$\begin{array}{r} 17. \quad 6\frac{5}{6} \\ \underline{3\frac{1}{6}} \end{array}$$

$$\begin{array}{r} 20. \quad 4\frac{7}{8} \\ \underline{3\frac{3}{8}} \end{array}$$

HOW FAST CAN YOU RUN?

1. Tom runs around the outdoor track in $3\frac{1}{4}$ minutes. Arnold takes $4\frac{1}{2}$ minutes to run the same distance. How much longer does Arnold take than Tom?

You cannot subtract $\frac{1}{4}$ from $\frac{1}{2}$ because they have different names. You must first change $\frac{1}{2}$ to $\frac{2}{4}$. Subtracting $3\frac{1}{4}$ from $4\frac{2}{4}$, you get $1\frac{1}{4}$.

Hence Arnold takes $1\frac{1}{4}$ minutes longer than Tom to run around the track.

$$\begin{array}{r} 4\frac{1}{2} = 4\frac{2}{4} \\ 3\frac{1}{4} = 3\frac{1}{4} \\ \hline 1\frac{1}{4} \end{array}$$

2. Little Bill runs around the track in $5\frac{3}{8}$ minutes. How much longer than Tom does he take?

3. Harry runs the same distance in $3\frac{1}{8}$ minutes. How much less is his time than Tom's?

Exercises

Subtract. Check the work by going over it again:

1. $\frac{3}{4}$ $\frac{1}{2}$	6. $2\frac{5}{8}$ $1\frac{1}{2}$	11. $9\frac{1}{2}$ $5\frac{1}{8}$	16. $8\frac{7}{8}$ $6\frac{3}{4}$	21. $6\frac{7}{8}$ 5
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2. $\frac{1}{4}$ $\frac{1}{8}$	7. $7\frac{3}{4}$ $2\frac{1}{2}$	12. $6\frac{1}{2}$ $3\frac{1}{4}$	17. $5\frac{3}{4}$ $3\frac{3}{8}$	22. $7\frac{3}{4}$ $2\frac{1}{8}$
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3. $\frac{5}{4}$ $\frac{3}{8}$	8. $4\frac{7}{8}$ $2\frac{1}{2}$	13. $3\frac{3}{4}$ $2\frac{1}{8}$	18. $3\frac{3}{8}$ $3\frac{1}{8}$	23. $2\frac{1}{2}$ $2\frac{1}{4}$
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4. $\frac{3}{4}$ $\frac{5}{8}$	9. $9\frac{3}{8}$ $3\frac{1}{4}$	14. $7\frac{1}{2}$ $2\frac{3}{8}$	19. $2\frac{1}{4}$ $\frac{1}{8}$	24. $6\frac{5}{8}$ $2\frac{1}{4}$
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5. $\frac{1}{2}$ $\frac{3}{8}$	10. $6\frac{7}{8}$ $5\frac{3}{4}$	15. $9\frac{1}{4}$ $6\frac{1}{8}$	20. $8\frac{3}{4}$ $2\frac{5}{8}$	25. $6\frac{7}{8}$ $2\frac{1}{4}$
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SELLING RIBBON AT THE FAIR



Anna is selling ribbon at the fair. Each day she keeps a record of her sales. When she sells $4\frac{1}{2}$ yd. of red ribbon, she writes $4\frac{1}{2}$ under the word "Red." When she sells $2\frac{3}{8}$ yd. of white ribbon, she writes $2\frac{3}{8}$ under "White."

This is Anna's record for to-day :

<i>Red</i>	<i>Blue</i>	<i>Yellow</i>	<i>White</i>	<i>Pink</i>	<i>Green</i>
$4\frac{1}{2}$	$5\frac{3}{8}$	$1\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{2}$
2	3	$4\frac{3}{4}$	$1\frac{1}{8}$	3	$2\frac{3}{8}$
$3\frac{1}{4}$	1	5	4	$1\frac{3}{4}$	$4\frac{7}{8}$
7	$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$

1. How many yards of red ribbon did Anna sell to-day? how many yards of each of the other colors?

2. How many yards of ribbon did Anna sell in all to-day? If she charged 24¢ a yard for each color, how much money did she take in?

Counting by Fractions

- Count by $\frac{1}{2}$'s to 8, beginning $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2.
 - Count by $\frac{1}{3}$'s to 6, beginning $\frac{1}{3}$, $\frac{2}{3}$, 1, $1\frac{1}{3}$, $1\frac{2}{3}$.
 - Count by $\frac{1}{4}$'s to 6, beginning $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$.
 - Count by $\frac{1}{8}$'s to 5, beginning $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$.
- Remember that $\frac{2}{8} = \frac{1}{4}$, $\frac{4}{8} = \frac{1}{2}$, $\frac{6}{8} = \frac{3}{4}$, and $\frac{8}{8} = 1$.

FRACTIONS IN THE QUOTIENT

At a remnant sale Mrs. Root bought a 4-yard piece of silk for \$2.62. How much did it cost a yard?

Dividing \$2.62 by 4, you get \$.65, with a remainder of 2. If you write this remainder over the divisor, you get $\frac{2}{4}$, which reduces to $\frac{1}{2}$.

$$\begin{array}{r} 4 \overline{) \$2.62} \\ \$.65 \frac{2}{4} = \$.65 \frac{1}{2} \end{array}$$

Mrs. Root paid \$.65 $\frac{1}{2}$ a yard.

Exercises

In each problem, write the remainder over the divisor to form a fraction. Reduce the fraction to lowest terms:

1. Miss Allen bought a 4-yard piece of serge for \$3.02. How much did she pay per yard?

2. Betty paid \$.70 for a piece of lace to trim her dress. She measured it and found that it was exactly 8 ft. long. How much did the lace cost per foot?

3. Jane bought a 6-yard piece of linen for \$2.97. What was the price per yard?

Divide the following. Check the work by multiplying:

4. $8 \overline{) 60}$ 7. $8 \overline{) 78}$ 10. $4 \overline{) 150}$ 13. $8 \overline{) 804}$ 16. $6 \overline{) 274}$

5. $4 \overline{) 98}$ 8. $8 \overline{) 90}$ 11. $8 \overline{) 258}$ 14. $6 \overline{) 254}$ 17. $8 \overline{) 442}$

6. $4 \overline{) 63}$ 9. $4 \overline{) 94}$ 12. $6 \overline{) 135}$ 15. $9 \overline{) 921}$ 18. $4 \overline{) 654}$

19. Paul's father earns \$5.00 a day. If he works 8 hr. a day, how much does he earn in an hour?

20. Mr. Crane drove 1158 miles in his car in 8 days. How many miles did he average each day?

WHEN DID TOBY GET HIS SUPPER?

1. At 2 P.M. last Saturday Mr. Smithers told his son Toby that he would have to do 16 examples



before he could have any supper. Toby thought that he had plenty of time and went out at once to play handball with his friend. After $1\frac{3}{4}$ hr. he came home hungry. He found $\frac{1}{2}$ dozen biscuits in the pantry and carried off $\frac{2}{3}$ of them, with

a jar of jam. It took $\frac{1}{4}$ hr. to finish the biscuits and the jam. What time was it then? How many biscuits did he eat?

2. Toby then did $\frac{1}{4}$ of the 16 examples in $\frac{1}{2}$ hr. The next hour he did only $\frac{1}{4}$ of the remaining examples because he was playing with the dog. How late was it then? How many examples had Toby still to do?

3. Toby now did $\frac{1}{3}$ of the remaining examples on the front porch in $\frac{3}{4}$ hr. Suddenly Uncle Joe drove by. Toby climbed into the car, taking his examples with him. In $\frac{1}{4}$ hr. they reached Uncle Joe's house. What time was it then?

4. Toby at once began to finish the examples. They took $2\frac{1}{2}$ min. each. As soon as they were finished, Toby had supper with Uncle Joe. At what time did Toby start to eat his supper?

SOLVING HARD PROBLEMS

The pupils in our class want to earn money to buy some pictures. They divide into two teams to sell magazine subscriptions. On each subscription they make \$.50 profit. Team A gets 42 subscriptions. Team B makes a profit of \$18.50. How much more money does one team make than the other?

To help you in solving a hard problem like this, you should ask yourself these questions:

1. *What does the problem mean?* Make sure that you know the meaning of all the words in the problem, like "subscription" and "profit."

2. *What is to be found?* You must find how much more one team makes than the other team.

3. *How can the numbers given in the problem be used to get the answer?* You take these two steps:

First Step: Team A makes \$.50 on each of 42 subscriptions. Since $42 \times \$.50 = \21.00 , Team A makes \$21.00.

First Step

$$\begin{array}{r} \$.50 \\ 42 \\ \hline 1\ 00 \\ 20\ 0 \\ \hline \$21.00 \end{array}$$

Second Step: Team B makes \$18.50. Subtract \$18.50 from \$21. You find that Team A makes \$2.50 more than Team B. The answer is \$2.50.

Second Step

$$\begin{array}{r} \$21.00 \\ 18.50 \\ \hline \$\ 2.50 \end{array}$$

4. *Is the work right?* Check the multiplication and the subtraction. Read the problem again to see if your answer tells what you were asked to find.

SOME PROBLEMS TO MAKE YOU THINK

In solving each of the following problems, ask yourself the four questions given on page 119.

1. Three children buy their mother a Christmas present for \$2.00, their father a present for \$1.50, and their uncle a present for \$1.30. How much must each child pay if they share the expense equally?

2. Edward sells 48 glasses of lemonade at 3¢ a glass. He pays 40¢ for the lemons and his mother furnishes the sugar. How much is Edward's profit?

3. Our baseball manager buys 2 baseballs at \$.75 each, 3 bats at \$1.25 each, 1 mitt for \$3.90, and 1 glove for \$1.47. How much does he pay in all?

4. Harry wants a bicycle that costs \$35.15. He has \$8.55 which his uncle gave him, \$3.55 which he earned, and he receives \$12 for his birthday. How much more money must Harry get before he can buy the bicycle?

5. A family went on an automobile trip for 6 days. They rode 200 miles the first day, 189 miles the second day, and 196 miles the third day. The last 3 days they went as many miles as they had gone the first 3 days. How far did they go in all?

6. Mary buys 5¢ worth of jelly beans at 5 for 1¢ and 10¢ worth of lollipops at 1¢ each. Paul buys 24 mints; he also gets 5¢ worth of gumdrops at 2 for 1¢. How many pieces of candy do both buy in all?

EDITH'S CHICKENS

1. Edith spent \$12.60 for baby chickens at 15¢ each. How many chickens did she buy?

Remember that $\$12.60 = 1260¢$.

2. A rat killed 6 of Edith's chickens and 12 chickens died. All the others lived. How many chickens did Edith raise?



3. Edith read in a book that it takes 34 lb. of feed to raise each chicken. How many pounds of feed did she need to raise 66 chickens? At 3¢ a pound how much did the feed cost?

4. Edith's other expenses amounted to \$12.06. Adding this amount to the expenses in ex. 1 and 3, find her total expenses.

5. When the chickens were raised, Edith sold 28 of them. These weighed 142 lb. in all. How much did she receive for them at 32¢ a pound?

6. Edith kept 38 chickens to lay eggs. If each of them was worth \$3.25, how much were the 38 chickens worth?

7. The answer to ex. 4 gives Edith's total expenses. The total value of the chickens she sold and of the ones she kept was \$168.94. What was her profit?

After this Edith's profit will be still greater because the chickens will lay eggs which she can sell.

HOURS AND MINUTES

1. How many hands has this watch? To what number is the minute hand pointing? the hour hand? the second hand? What time does the watch show?



2. Each small space on the edge of the seconds' dial shows 1 second.

How many times does the second hand go around in 1 minute? How many seconds make 1 minute?

3. Remember the following table of *time*:

60 seconds (sec.) = 1 minute (min.)
60 minutes (min.) = 1 hour (hr.)
24 hours (hr.) = 1 day (da.)

4. We write 37 minutes past 8 like this: 8.37 or 8:37 or 8 37. If the time by Irma's watch is 8.37 and the right time is 8.43, how slow is Irma's watch?

5. Henry went to play at 2.40. He had to be back at 3.30. How many minutes had he to play?

6. Ben runs around the school yard in 55 sec., Sam in 58 sec., and Nat in 1 min. 4 sec. How much longer does Nat take than Sam? than Ben?

Tell what numbers should be put in place of the dots:

7. $\frac{1}{2}$ hr. = . . . min.

10. 2 min. = . . . sec.

8. $\frac{3}{4}$ hr. = . . . min.

11. $\frac{1}{4}$ min. = . . . sec.

9. 4 hr. = . . . min.

12. $1\frac{1}{2}$ min. = . . . sec.

TRAVELING BY TRAIN

1. Each day begins at 12 o'clock midnight. From 12 o'clock midnight to 12 o'clock noon is called *morning* and is written A.M. From 12 o'clock noon to 12 o'clock midnight is called *afternoon* and is written P.M.

2. A train leaves Chicago at 2.10 A.M. Is this in the morning or in the afternoon?

3. Charles went to meet his mother, who was coming home on Train No. 16. When he reached the station, he read this:

TRAIN BULLETIN

TRAIN	DUE	WILL ARRIVE
No. 16	1.35 P.M.	2.50 P.M.
No. 4	1.40 P.M.	2.30 P.M.
No. 23	2.15 P.M.	2.50 P.M.

Charles saw that his mother's train was due at 1.35 P.M., but would arrive at 2.50 P.M. Charles thought, "From 1.35 to 2.35 is 1 hr. From 2.35 to 2.50 is 15 min. Then the train is 1 hr. 15 min. late." Was he right?

4. How late was each of the other trains?

5. If you want to travel from Philadelphia to Washington, D.C., in the quickest time, which of these trains should you take?

TRAIN	No. 405	No. 181	No. 127
Leaves Philadelphia	7.25 A.M.	11.14 A.M.	5.00 P.M.
Arrives Washington	10.30 A.M.	2.15 P.M.	7.45 P.M.

MONTHS

1. Name the months of the year, beginning with January. How many months are there in a year?
2. What names do these abbreviations stand for: Jan., Apr., Feb., Mar., Aug., Nov., Sept., Dec., Oct.?
3. Learn this table of *time*:

7 days (da.) = 1 week (wk.)
About 52 weeks (wk.) = 1 year (yr.)
365 days or 12 months (mo.) = 1 year
366 days (da.) = 1 leap year
100 years (yr.) = 1 century

4. Leap years come every 4 years and can be divided exactly by 4.

Thus, 1928 and 1932 are leap years; but the century years, such as 1900 and 2000, are leap years only when exactly divisible by 400.

5. February has 28 days each year except in a leap year. In leap years it has 29 days. How many days had February in 1924? in 1927?

6. Memorize this rime:

Thirty days have September,
April, June, and November;
All the rest have thirty-one,
Except the second month alone,
To which we twenty-eight assign
Till leap year gives it twenty-nine.

7. Name each month that has 31 da.; 30 da.
8. Which month has less than 30 days?

MONTHS AND DAYS

1. Tell on what date each of these days comes :

New Year's Day	Decoration Day
Lincoln's Birthday	Independence Day
Washington's Birthday	Columbus Day
St. Valentine's Day	Christmas

2. How many days after Christmas is New Year's Day?

3. Thanksgiving Day is the last Thursday in November. On what date is Thanksgiving Day this year?

4. On what date is Easter Sunday this year?

5. When does Labor Day come this year?

6. On what date does your school close for the summer this year? On what date does it open again next fall? How many days of vacation will you have? How many weeks and days is that?

7. How many days longer than 4 weeks is a 30-day month? a 31-day month?

8. Last spring John's uncle was away on a business trip from March 2 to April 4. How many days was he away?

Count April 4, but do not count March 2.

9. Jessie was born April 15, 1918. How old was she on April 15, 1928? How old will she be on April 15, 1942?

10. Louise was born on Oct. 25, 1921. How many years and months old will she be next Christmas?

MILES AND RODS

To measure long distances out of doors, we often use the *rod* and the *mile*. A farmer may use the rod to measure the length of a field or the distance he lives from his neighbor. Very long distances, like the distance between two cities, are measured in miles.

1. One rod is $5\frac{1}{2}$ yd. long. How many feet are there in 1 rod?
2. There are 320 rods in 1 mile. How many yards are there in 1 mile? how many feet?
3. Learn this table of *length*:

12 inches (in.) = 1 foot (ft.)
3 feet (ft.) = 1 yard (yd.)
$16\frac{1}{2}$ ft. or $5\frac{1}{2}$ yd. = 1 rod (rd.)
5280 ft. or 320 rd. = 1 mile (mi.)

4. Stand about a rod away from the door of your classroom, estimating the distance as nearly as you can. Then measure the distance with a yardstick to see how nearly correct you are. How many yards and feet make 1 rod?
5. Estimate in rods the length and the width of your school yard. Test your estimate by measuring the yard.
6. In the Field Day exercises Jack ran in the 100-yard dash. How many feet did he run?

COMPARING DISTANCES

1. Cities are often laid off in blocks that are 16 rd. long. How many feet are there in such a block? How many such blocks make 1 mi.?

2. Harry walks 10 blocks to school every morning. What part of a mile is that? How many miles does he walk at noon if he walks home to lunch and back?

3. Try to find out how many feet long the blocks in your town or city are. How many of these blocks make 1 mi.? Do you live about $\frac{1}{4}$ mi., $\frac{1}{2}$ mi., $\frac{3}{4}$ mi., 1 mi., or more from your school?

4. Hazel walks to school in $\frac{1}{2}$ hr. She can walk 3 mi. an hour. How far from school does she live?

5. The boys of our school had a $\frac{1}{4}$ -mile race. How many rods did they run? how many yards?

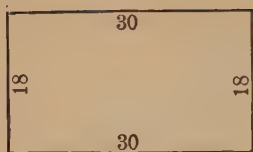
6. An ocean liner is 880 ft. long. How many such liners, put end to end, would make 1 mi.?

7. The Brooklyn Bridge is 6016 ft. long. How many feet longer than 1 mile is it?

Tell what numbers should be put in place of the dots:

- | | | |
|---------------------------------|-----------------------------|-------------------|
| 8. $\frac{1}{2}$ mi. = . . rd. | 8 yd. = . . ft. | 2 mi. = . . ft. |
| 9. $\frac{1}{4}$ mi. = . . rd. | 6 rd. = . . yd. | 240 ft. = . . yd. |
| 10. 3 mi. = . . ft. | 4 yd. = . . in. | 240 in. = . . ft. |
| 11. $\frac{1}{2}$ mi. = . . ft. | $\frac{1}{4}$ mi. = . . ft. | 640 rd. = . . mi. |
| 12. $\frac{1}{2}$ mi. = . . yd. | $\frac{1}{8}$ mi. = . . ft. | 110 yd. = . . ft. |

PERIMETERS



1. Roland is buying *wire fence to put around his garden. The diagram at the left shows how many feet long each side of the garden is.

30
18
30
18

96

How many feet of fence does Roland need?

The distance around the garden is 96 ft.; hence Roland needs 96 ft. of fence.

The distance around the garden is called the **perimeter** of the garden. You see that the perimeter is found by adding together the number of feet on each side.

2. At 5¢ a foot, how much will Roland pay for 96 ft. of fence?

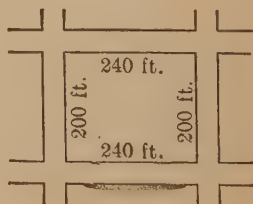
Multiply the easier way. What does 480¢ equal?

3. William's garden has 4 sides, each side being 25 ft. long. What is the perimeter of this garden?

4. At 4¢ a foot, find the cost of enough wire fence to go all around William's garden.

5. Measure your school yard. Find its perimeter.

6. This is a picture of the block in which Charles lives. What is the distance in feet around this block? How many times would Charles have to run around this block to run a mile?



STUDYING SQUARES AND RECTANGLES

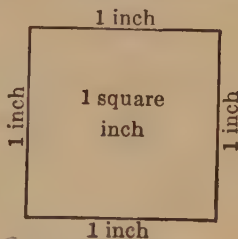
1. The figure at the right is a **square**. Measure it with your ruler. You find that each side is 1 in. long. Then this is a *1-inch square*. We say that the **area** of this figure is 1 *square inch*.

2. The corners of a square look like this:

These corners



are called *square corners* or *right angles*.



The corners of a square are all right angles.

3. Tell which of these are right angles:



4. Draw and cut out a square 2 in. long on each side. This is a 2-inch square. Now fold it into square inches. How many square inches does a 2-inch square contain? Then the area of a 2-inch square is 4 square inches.

5. Find the area of a 3-inch square; of a 4-inch square; of a 5-inch square.

6. This is a **rectangle**. How many sides has it? Are the sides of this rectangle all of the same length?



How many right angles has a rectangle?

7. Point out four rectangles in your schoolroom.

FINDING THE AREA OF A RECTANGLE

1. Draw a rectangle 4 in. long and 2 in. wide.



Mark off the inches on each side and draw dotted lines, as in the figure at the left. This divides the rectangle into square inches.

You can find the area of this rectangle by counting the square inches. Another way to find the area is to think: "There are 4 square inches in each long row and there are 2 long rows." Hence the area is:

2×4 square inches, or 8 square inches

2. Draw a rectangle 5 in. long and 3 in. wide. It contains 3 long rows, with 5 square inches in each. Hence the area of this rectangle is 3×5 square inches, or 15 square inches.

You see that in a rectangle the *length in inches times the width in inches gives the area in square inches*.

Is the rectangle in ex. 2 larger than the one in ex. 1? *The area of a rectangle tells how large it is.*

3. If a rectangle is 5 in. long and 2 in. wide, we say that it measures 5 in. by 2 in.

Find the area of each of these rectangles:

- | | | |
|-------------------|---------------------|---------------------|
| 4. 6 in. by 2 in. | 8. 8 in. by 3 in. | 12. 14 in. by 5 in. |
| 5. 5 in. by 4 in. | 9. 7 in. by 1 in. | 13. 17 in. by 6 in. |
| 6. 7 in. by 3 in. | 10. 10 in. by 6 in. | 14. 13 in. by 8 in. |
| 7. 6 in. by 4 in. | 11. 12 in. by 7 in. | 15. 15 in. by 7 in. |

SQUARE FEET

1. To measure the area of a large rectangle, like a blackboard, a square inch is too small. You must therefore use a larger unit, such as a square foot. A **square foot** is a square that has each side 1 ft. long. Its area is 1 square foot.

2. Draw a square foot on the blackboard. Do you see anything in the room that is about one square foot in area?

3. Our blackboard is 12 ft. long and 4 ft. wide. Then its area is 4×12 square feet, or 48 square feet.

4. How many feet long and how many feet wide is the blackboard in your room? What is its area?

5. A table has a marble top 5 ft. long and 3 ft. wide. How many square feet of marble is that?

Find the areas of rectangles that measure as follows:

- | | | |
|-------------------|---------------------|----------------------|
| 6. 9 ft. by 8 ft. | 10. 8 ft. by 4 ft. | 14. 13 ft. by 7 ft. |
| 7. 7 ft. by 2 ft. | 11. 7 ft. by 1 ft. | 15. 19 ft. by 4 ft. |
| 8. 6 ft. by 5 ft. | 12. 11 ft. by 4 ft. | 16. 18 ft. by 7 ft. |
| 9. 6 ft. by 3 ft. | 13. 10 ft. by 3 ft. | 17. 24 ft. by 15 ft. |

18. Ruth's room is 12 ft. by 10 ft. Helen's room is 11 ft. by 11 ft. Whose room is larger, and how much larger?

19. Jack is varnishing the floor of his mother's living room. It measures 14 ft. by 12 ft. How many square feet has Jack to varnish?

MEASURING A WALK

1. Mr. Sloan is laying a walk in front of his house. It is to be 2 yd. wide and 16 yd. long. What is its area?

To measure the area of a very large rectangle, like a walk or a floor, the square yard is often used. A **square yard** is a square that has each side 1 yd. long.

The walk contains 2×16 square yards, or 32 square yards.



2. How much will it cost to lay the walk in ex. 1 at \$2.35 per square yard?

3. How many square yards are there in a walk 1 yd. wide and 14 yd. long? in a walk 2 yd. by 23 yd.?

Find the number of square yards in these rectangles:

4. 7 yd. by 2 yd.

9. 1 yd. by 1 yd.

5. 3 yd. by 1 yd.

10. 9 yd. by 1 yd.

6. 6 yd. by 2 yd.

11. 13 yd. by 11 yd.

7. 3 yd. by 3 yd.

12. 27 yd. by 14 yd.

8. 9 yd. by 7 yd.

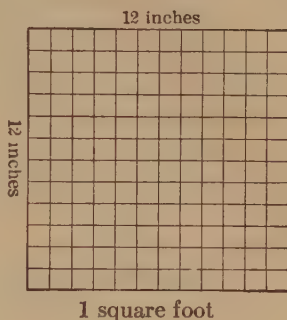
13. 21 yd. by 13 yd.

14. If a rectangle measures 5 in. by 4 in., its area is 20 sq. in. What is the area if it measures 5 ft. by 4 ft.? 5 yd. by 4 yd.?

In finding areas, the numbers you multiply must always have the same name.

COMPARING SQUARE INCHES AND SQUARE FEET

1. Draw a square measuring 1 ft. on each side. Mark off each side in inches and draw lines, as in the figure on the right, to divide the square into square inches. How many square inches equal 1 square foot?



2. On the blackboard draw a square measuring 1 yd. on each side. Divide the square into square feet. How many square feet equal 1 square yard?

3. Remember this table of *square measure*:

144 square inches (sq. in.)	= 1 square foot (sq. ft.)
9 square feet (sq. ft.)	= 1 square yard (sq. yd.)

4. The area of Mrs. Drew's kitchen floor is 108 sq. ft. How many square yards is that?

Since it takes 9 sq. ft. to make 1 sq. yd., divide 108 by 9 to find the number of square yards.

5. How many square yards of linoleum does it take to cover a floor 4 yd. long and 3 yd. wide?

Tell what numbers should be put in place of the dots:

- | | |
|--|---------------------------------|
| 6. 1 sq. ft. = . . . sq. in. | 9. 2 sq. yd. = . . . sq. ft. |
| 7. $\frac{1}{2}$ sq. ft. = . . . sq. in. | 10. 27 sq. ft. = . . . sq. yd. |
| 8. 3 sq. ft. = . . . sq. in. | 11. 288 sq. in. = . . . sq. ft. |

HOW TO MAKE DRAWINGS TO SCALE

1. Betty has a rectangular tulip bed 6 ft. long and 2 ft. wide. Make a drawing of this bed, letting 1 in. on your drawing stand for 1 ft.

This is called **drawing to scale**.

How long should the tulip bed be on your drawing?
How wide should it be?

2. Betty's strawberry patch is 7 ft. long and 5 ft. wide. Make a drawing of it, letting 1 in. stand for 1 ft.

3. Frank's garden is 4 yd. long and 3 yd. wide. Make a drawing of it, letting 1 in. stand for 1 yd.

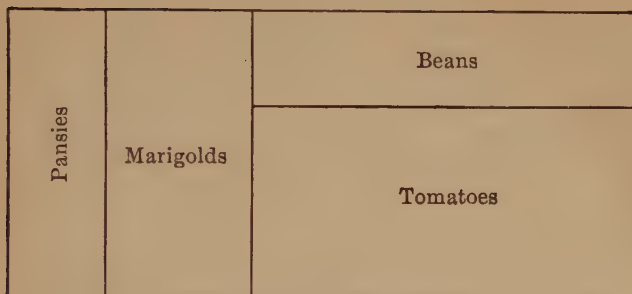
4. In the woods John is building a hut 8 ft. long and 4 ft. wide. He wants to make a drawing of the floor of the hut, letting $\frac{1}{4}$ in. stand for 1 ft. To do this he thinks, "Since $\frac{1}{4}$ in. stands for 1 ft., then 1 in. stands for 4 ft. and 2 in. stand for 8 ft." Hence he makes the drawing 1 in. wide and 2 in. long. Does he make the drawing the right length and width?

5. Louis is building a canoe shed 8 ft. by 16 ft. Make a drawing of it, letting $\frac{1}{4}$ in. stand for 1 ft. How many feet will 1 in. stand for? 2 in.? 4 in.?

6. Mr. Dunn has a cornfield 4 rd. by 12 rd. Make a drawing of the field, letting $\frac{1}{4}$ in. stand for 1 rd.

7. If you let $\frac{1}{2}$ in. stand for 1 yd., how many yards will 1 in. stand for? 4 in.? 6 in.? Draw a barn 8 yd. by 12 yd., letting $\frac{1}{2}$ in. stand for 1 yd.

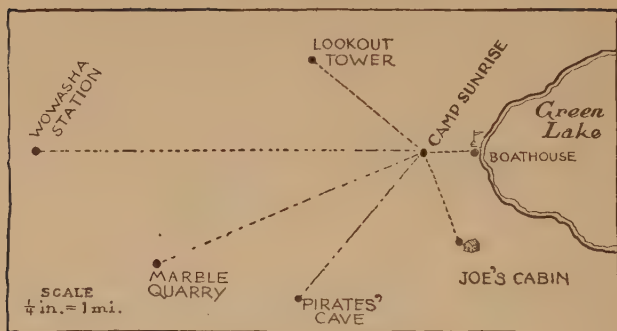
ROBERT'S GARDEN



Scale: $\frac{1}{4}$ inch = 1 foot

1. What does Robert grow in his garden?
2. In this drawing $\frac{1}{4}$ in. stands for 1 ft. How many feet does $\frac{1}{2}$ in. stand for? How many feet does 1 in. stand for? $1\frac{1}{2}$ in.?
3. Measure the width of the entire garden on the drawing. How many feet wide is the garden?
4. Measure the length of the garden on the drawing. How many feet do 3 in. stand for? $3\frac{1}{4}$ in.? Then how many feet long is the garden?
5. Find the area in square feet of the entire garden.
6. How long is Robert's pansy bed? How wide is it? How many square feet does it contain?
7. How many feet does $\frac{3}{4}$ in. stand for? $1\frac{1}{2}$ in.? How wide and how long is the bed of marigolds?
8. How wide and how long is the bean plot? the tomato plot? Find the area of each. The tomato plot is how many times as large as the bean plot?

CAMP SUNRISE



Eugene is going to Camp Sunrise next summer. Above is a map of the camp and the country around it. In the lower left-hand corner you read " $\frac{1}{4}$ in. = 1 mi." What does this mean?

1. On this map, how many miles does $\frac{1}{2}$ in. stand for? $\frac{3}{4}$ in.? 1 in.? 2 in.? 3 in.?

2. To find the distance from Camp Sunrise to the boathouse, measure with your ruler the dotted line between these points. This line is $\frac{1}{4}$ in. long. Since $\frac{1}{4}$ in. = 1 mi., it is 1 mi. from the camp to the lake.

3. Measure the line from Camp Sunrise to Lookout Tower. How far is it from the camp to the tower?

4. How far from the camp is the marble quarry?

5. How far is it from the camp to the Pirates' Cave? to Joe's Cabin?

6. How far is it from the camp to Wowasha Station?

PROBLEMS

Be sure that you understand each problem before you begin to work it. When you finish, read the problem over to see if you have found what was asked for.

1. Mary's marks in spelling last week were 95, 80, 95, 100, 90. What was her average mark last week?

2. Stanley had \$4.52. He spent \$1.76 for a watch. Now he wants to buy a bugle that costs \$2.95. How much more money does he need?

3. Mary bought $\frac{1}{2}$ doz. cookies at 30¢ a dozen and $1\frac{5}{8}$ lb. of nut cake at 48¢ a pound. How much did she spend for both?

4. Horace has $2\frac{1}{2}$ lb. of candy. He gives 1 lb. to his mother, $\frac{1}{2}$ lb. to his aunt, $\frac{1}{4}$ lb. to his brother, and $\frac{1}{4}$ lb. to his sister. How much candy has he left?

5. Our scout troop walked from 9.15 to 11.35 this morning. This afternoon we walked from 2.10 to 4.45. How many hours and minutes did we walk to-day?

6. The Scholars' Club collected \$25 from each of 413 people. This money was used to help 175 bright children go to high school. How much did each child receive?

7. The Brown School has a piece of land 42 ft. long and 40 ft. wide. If it divides this land into 35 school gardens each of the same size, how many square feet will each garden contain?

DRILL EXERCISES

Read the following numbers:

- | | | |
|--------------|---------------|----------------|
| 1. 4,804,621 | 3. 19,002,400 | 5. 651,270,021 |
| 2. 9,500,703 | 4. 30,303,003 | 6. 700,645,000 |

Add without copying. Practice until you can do and check the following 7 examples in 7 minutes:

7. 6	8. 7	9. 5	10. 5	11. 3	12. 8	13. 5
5	4	3	9	8	0	3
0	0	4	7	5	6	9
4	7	8	3	0	5	9
8	1	4	0	1	2	5
5	9	3	2	8	9	1
7	6	9	7	6	2	3
3	6	1	6	6	7	1
8	2	8	7	3	3	4
6	9	0	9	0	0	1
9	5	4	5	9	2	0
5	6	4	4	4	8	8
2	0	7	6	2	1	3
3	8	7	1	9	5	8

Practice until you can subtract and check the following 8 examples in 6 minutes (after copying):

14. \$969.00	16. \$8625.85	18. \$5262.20	20. \$8782.25
358.48	703.86	629.80	7695.95
15. \$816.50	17. \$8709.48	19. \$8250.89	21. \$8000.00
470.75	6154.69	3869.50	5571.62

DRILL EXERCISES

Add without copying. Practice until you can do and check 4 of the following examples in 8 minutes:

1. 6593	3. 4246	5. \$66.03	7. \$58.97
5067	2689	80.59	5.21
565	5760	7.21	63.25
6307	9742	91.76	38.50
7150	3108	46.90	7.83
8995	8295	49.63	70.08
<u>3442</u>	<u>6910</u>	<u>94.01</u>	<u>77.38</u>
2. 4797	4. 1154	6. \$94.86	8. \$71.77
2871	1755	56.80	83.93
9304	7922	20.04	44.49
880	2369	48.19	7.13
4318	7078	86.85	62.04
3621	8254	54.92	90.41
<u>8569</u>	<u>9399</u>	<u>27.38</u>	<u>34.66</u>

Practice until you can multiply and check 5 of the following examples in 8 minutes (after copying):

9. 467	11. 932	13. 607	15. 853	17. 769
<u>453</u>	<u>786</u>	<u>680</u>	<u>901</u>	<u>290</u>
10. 548	12. 430	14. 365	16. 845	18. 928
<u>708</u>	<u>690</u>	<u>742</u>	<u>905</u>	<u>340</u>

Divide. Check by multiplying:

19. 8305 ÷ 79	22. 22,969 ÷ 34	25. 70,628 ÷ 262
20. 9551 ÷ 63	23. 92,563 ÷ 451	26. 166,116 ÷ 327
21. 8460 ÷ 18	24. 81,120 ÷ 390	27. 514,775 ÷ 789

DRILL EXERCISES

Add. Reduce fractions in answers to lowest terms:

- | | | | | | |
|---|---|---|--|--|--|
| 1. $\frac{1}{2}$
<u>$\frac{1}{2}$</u> | 2. $\frac{5}{8}$
<u>$\frac{1}{8}$</u> | 3. $\frac{3}{4}$
<u>$\frac{1}{8}$</u> | 4. $6\frac{1}{4}$
<u>$3\frac{1}{2}$</u> | 5. $2\frac{3}{4}$
<u>$3\frac{1}{2}$</u> | 6. $5\frac{3}{8}$
<u>$6\frac{5}{8}$</u> |
| 7. $\frac{3}{4}$
<u>$\frac{3}{4}$</u> | 8. $\frac{3}{4}$
<u>$\frac{7}{8}$</u> | 9. $\frac{7}{8}$
<u>$\frac{7}{8}$</u> | 10. $9\frac{1}{4}$
<u>$3\frac{7}{8}$</u> | 11. $8\frac{5}{8}$
<u>$6\frac{1}{2}$</u> | 12. $9\frac{3}{4}$
<u>$4\frac{3}{8}$</u> |
| 13. $\frac{1}{8}$
<u>$\frac{3}{8}$</u>
<u>$\frac{3}{8}$</u> | 14. $\frac{1}{2}$
<u>$\frac{3}{4}$</u>
<u>$\frac{1}{4}$</u> | 15. $\frac{7}{8}$
<u>$\frac{1}{8}$</u>
<u>$\frac{1}{4}$</u> | 16. $5\frac{1}{2}$
<u>6</u>
<u>$4\frac{3}{4}$</u> | 17. $6\frac{3}{4}$
<u>$5\frac{1}{4}$</u>
<u>$4\frac{3}{4}$</u> | 18. $9\frac{3}{8}$
<u>$4\frac{1}{2}$</u>
<u>5</u> |

*Subtract. Reduce fractions in answers to lowest terms.
Check by going over the work again:*

- | | | | | |
|--|--|--|--|--|
| 19. $8\frac{5}{8}$
<u>$6\frac{3}{8}$</u> | 21. $9\frac{1}{2}$
<u>3</u> | 23. $16\frac{7}{8}$
<u>$11\frac{1}{8}$</u> | 25. $9\frac{1}{4}$
<u>$3\frac{1}{8}$</u> | 27. $7\frac{7}{8}$
<u>$2\frac{1}{4}$</u> |
| 20. $7\frac{3}{4}$
<u>$2\frac{1}{4}$</u> | 22. $9\frac{7}{8}$
<u>$6\frac{5}{8}$</u> | 24. $10\frac{5}{8}$
<u>$\frac{1}{2}$</u> | 26. $8\frac{3}{4}$
<u>$4\frac{3}{8}$</u> | 28. $5\frac{1}{2}$
<u>$3\frac{1}{8}$</u> |

Find the following. Check by going over the work:

- | | | |
|--------------------------|-----------------------------|-----------------------------|
| 29. $\frac{1}{8}$ of 648 | 33. $\frac{3}{4}$ of \$4.64 | 37. $\frac{1}{2}$ of \$6.40 |
| 30. $\frac{1}{2}$ of 140 | 34. $\frac{7}{8}$ of \$7.20 | 38. $\frac{5}{8}$ of \$4.56 |
| 31. $\frac{2}{5}$ of 250 | 35. $\frac{2}{3}$ of \$3.63 | 39. $\frac{4}{5}$ of \$5.95 |
| 32. $\frac{3}{8}$ of 160 | 36. $\frac{3}{5}$ of \$2.75 | 40. $\frac{3}{8}$ of \$7.20 |

Multiply. Check by going over the work again:

- | | | | | |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 41. | 42. | 43. | 44. | 45. |
| \$1.42 | \$2.44 | \$1.28 | \$1.20 | \$3.48 |
| <u>$5\frac{1}{2}$</u> | <u>$3\frac{1}{4}$</u> | <u>$2\frac{3}{8}$</u> | <u>$2\frac{5}{8}$</u> | <u>$4\frac{3}{4}$</u> |

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of fractions	100, 108	subtraction of	113
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		Improper fraction	98, 99
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in multiplication	20, 49	Long division	32, 54, 81, 86
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		Measures, length	126
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one hundred combinations in	10		

ANSWERS TO STRAYER-UPTON ARITHMETICS BOOK TWO

Page 2. — 8. 67,408; 508,109; 289,007; 607,501. 9. 9999; 99,999; 999,999; 1000; 10,000; 100,000.

Page 4. — 1. 25. 2. 34. 3. 32. 4. 25. 5. 33. 6. 38.
7. 30. 8. 23. 9. 31. 10. 28. 11. 30. 12. 33. 13. 22.
14. 19. 15. \$1174.46. 16. \$1308.31. 17. \$1639.56.
18. \$824.61. 19. 3452. 20. 2719. 21. 3408. 22. 2220.
23. 3313.

Page 5. — 1. 442. 2. 388. 3. 352. 4. 371. 5. 349.
6. 398. 7. 460. 8. 401. 9. 324. 10. 581. 11. 491.
12. 438. 13. 49. 14. 51. 15. 40. 16. 49. 17. 49. 18. 55.
19. 46. 20. 42.

Page 7. — 1. Abner, 5 lb.; Billy, 4 lb.; Dan, 7 lb.; Edgar, 7 lb.; Fred, 4 lb.; Jerry, 7 lb.; Jesse, 9 lb.; Mark, 0 lb.; Nat, 3 lb.; Peter, 6 lb.; Ralph, 7 lb.; Rollo, 4 lb.; Anna, 7 lb.; Betty, 9 lb.; Clara, 8 lb.; Doris, 4 lb.; Grace, 5 lb.; Helen, 6 lb.; Ida, 9 lb.; Julia, 6 lb.; Maud, 3 lb.; Nora, 5 lb.; Polly, 2 lb.; Susan, 8 lb. 2. Abner, Billy, Dan, Edgar, Nat, Ralph, Anna, Doris, Grace, Helen, Ida, Julia, Maud, and Nora.
3. Fred, Jerry, Jesse, Peter, Rollo, Betty, Clara, Polly, and Susan.
4. Mark.

Page 8. — 1. \$24.40. 2. \$28.52. 3. \$26.44. 4. \$20.98.
5. \$30.24; \$15.12.

Page 11. — 1. 19; 29; 16; 37; 48; 37; 47; 27; 46. 2. 2 cents, 1 nickel, 1 dime; 2 cents, 2 dimes; 3 cents, 1 nickel, 1 quarter; 4 cents, 1 dime; 1 dime, 1 quarter; 2 cents, 1 dime; 4 cents; 4 cents, 1 nickel, 1 dime. 3. 1 cent, 1 nickel, 1 quarter; 4 cents, 1 dime, 1 quarter; 2 cents; 3 cents, 2 dimes; 1 nickel; 1 cent, 1 dime; 1 quarter; 1 cent, 1 nickel. 4. 357. 5. 379. 6. 196.
7. 388. 8. 124. 9. 277. 10. 140. 11. 396. 12. 199.
13. 454. 14. 528. 15. 499. 16. 208. 17. 153. 18. 507.
19. 1258. 20. 5699. 21. 2623. 22. 6857. 23. 3760.
24. 6966. 25. 2087. 26. 1856. 27. 2075. 28. 3438.
29. 1706. 30. 4374.

Page 12. — 1. Yes. 2. \$60.75. 3. \$125.50.

Page 13. — 1. 18,179. 2. 34,942. 3. 28,795. 4. 23,309.
 5. 52,774. 6. 26,838. 7. 45,374. 8. 46,590. 9. 40,956.
 10. 33,599. 11. 39,718. 12. 50,699. 13. 16,785. 14. 39,550.
 15. 14,728. 16. 19,002. 17. \$47.76. 18. \$363.67.
 19. \$177.49. 20. \$485.93. 21. \$560.43. 22. \$149.68.
 23. \$355.39. 24. \$279.10. 25. \$187.20. 26. \$196.68.
 27. \$254.58. 28. \$143.87. 29. \$749.95. 30. \$504.56.
 31. \$218.59. 32. \$837.86. 33. \$23.74.

Page 15. — 1. 70; 140; 280; 500; 1200; 4590; 17,320.
 2. 90; 330; 900; 690; 3830; 6700; 14,500. 3. 4900; 7000;
 68,500; 43,000; 94,800; 149,800; 56,400. 4. 49,000; 70,000;
 685,000; 430,000; 948,000; 1,498,000; 564,000. 5. 90¢.
 6. \$1.70. 7. \$3.00. 8. \$200. 9. \$20. 10. \$15. 11. 100¢;
 50¢; 250¢; 500¢; 1000¢; 2500¢.

Page 16. — 1. 540. 2. 1890. 3. 81,500. 4. 55,000.
 5. 142,400. 6. 253,200. 7. 78,000. 8. 364,000. 9. 1350.
 10. 3480. 11. 254,000. 12. 93,000. 13. 1,467,000.
 14. 2,000,000. 15. \$1288.

Page 17. — 1. 6; 17; 23; 58; 145; 390. 2. 4; 28; 18;
 20; 160; 200. 3. 5; 7; 16; 45; 27; 48. 4. 3; 9; 23; 50;
 70; 90. 5. 50; 70; 160; 450; 270; 480; 30; 90; 230;
 500; 700; 900. 6. \$9. 7. \$4. 8. 8 dimes; 6 dimes;
 25 dimes; 20 dimes. 9. 5 dollars.

Page 20. — 1. 276 miles. 2. 903 flowers. 3. 2016 stamps.
 4. 714. 5. 1888. 6. 736. 7. 1961. 8. 882. 9. 6256.
 10. 429. 11. 3915. 12. 946. 13. 1298. 14. 1426. 15. 2448.

Page 21. — 1. 240 glasses. 2. 2625 gal. 3. 1430 apples.
 4. 4316. 5. 4116. 6. 3185. 7. 2394. 8. 2044. 9. 2184.
 10. 3876. 11. 4352. 12. 2784. 13. 3525. 14. 3081.
 15. 2322. 16. 4416. 17. 2538. 18. 3612. 19. 2231.
 20. 2709. 21. 3060. 22. 3649. 23. 1225. 24. 4335.
 25. 918. 26. 1185. 27. 3468. 28. 1728. 29. 1078.
 30. 1275. 31. 2263. 32. 2788. 33. 1071. 34. 1176.
 35. 1272. 36. 1197. 37. 3692. 38. 1508. 39. 2368.
 40. 1504. 41. 3430. 42. 5106. 43. 7031. 44. 3854.
 45. 7098.

Page 22. — 1. \$26.25. 2. \$58.50.

Page 23. — 1. \$17.55. 2. \$16.80. 3. \$5.75. 4. \$107.88.
 5. \$29.28. 6. \$23.38. 7. \$14.31. 8. \$340.83. 9. \$201.64.
 10. \$11.56. 11. \$43.68. 12. \$153.34. 13. \$247.32.
 14. \$13.26. 15. \$74.00. 16. \$301.15. 17. \$42.84.

18. \$94.24.	19. \$334.08.	20. \$230.77.	21. \$267.12.
22. \$426.72.	23. \$196.52.	24. \$96.85.	25. \$36.48.
26. \$34.02.	27. \$234.09.	28. \$515.48.	29. \$28.86.
30. \$352.31.	31. \$167.48.	32. \$289.44.	33. \$108.00.
34. \$290.29.	35. \$332.94.	36. \$186.96.	37. \$58.83.
38. \$157.92.	39. \$449.88.	40. \$49.28.	41. \$143.85.
42. \$223.44.	43. \$53.89.	44. \$270.66.	45. \$79.68.
46. \$218.29.			

Page 27. — 3. $31\frac{1}{2}$. 4. $15\frac{2}{3}$. 5. $12\frac{1}{4}$. 6. $12\frac{3}{5}$. 7. $9\frac{3}{8}$.
8. $57\frac{1}{2}$. 9. $142\frac{2}{3}$. 10. $59\frac{3}{4}$. 11. $74\frac{4}{5}$. 12. $17\frac{1}{8}$.

Page 28. — 1. $2\frac{1}{2}\text{¢}$. 2. $3\frac{1}{3}\text{¢}$. 3. $12\frac{1}{2}\text{¢}$. 4. $\frac{1}{3}\text{¢}$. 5. $4\frac{1}{6}\text{¢}$.
6. $33\frac{1}{3}\text{¢}$; $37\frac{1}{2}\text{¢}$; $62\frac{1}{2}\text{¢}$; $43\frac{3}{4}\text{¢}$. 7. $387\frac{1}{2}$. 8. $76\frac{2}{3}$. 9. $59\frac{1}{8}$.
10. $118\frac{1}{8}$. 11. $187\frac{3}{4}$. 12. $79\frac{2}{3}$. 13. $84\frac{5}{7}$. 14. $259\frac{1}{2}$. 15. $72\frac{4}{5}$.
16. $59\frac{3}{8}$. 17. $148\frac{5}{8}$. 18. $95\frac{1}{4}$. 19. $298\frac{1}{3}$. 20. $39\frac{1}{9}$. 21. $106\frac{3}{7}$.
22. \$.46 $\frac{4}{5}$. 23. \$.236 $\frac{3}{4}$. 24. \$.59 $\frac{7}{8}$. 25. \$.47 $\frac{5}{8}$. 26. \$1.30 $\frac{1}{8}$.

Page 29. — 3. \$.27.

Page 30. — 1. 66 bags. 2. $15\frac{3}{4}$ miles. 3. 17¢. 4. 35 pupils.
5. $223\frac{3}{4}$ miles. 6. $58\frac{3}{4}$ lb. 7. $50\frac{3}{8}$ in.

Page 31. — 1. 86. 2. 90; yes. 3. 88. 4. 87. 5. 95.
6. 91; Jennie. 7. $86\frac{1}{8}$. 8. 75. 9. 79.

Page 33. — 1. 23. 2. 34. 3. 43. 4. 22. 5. 45. 6. 36.
7. 17. 8. 41. 9. 324. 10. 181. 11. 421. 12. 647.
13. 556. 14. 239. 15. 438. 16. 349. 17. 263. 18. 465.
19. 831. 20. 381. 21. 31. 22. 13. 23. 32. 24. 45.
25. 64. 26. 57. 27. 44. 28. 83. 29. 443. 30. 374.
31. 322. 32. 727. 33. 331. 34. 266. 35. 414. 36. 358.
37. 433. 38. 397. 39. 123. 40. 369.

Page 34. — 3. 3 rows; 3 chairs left.

Page 35. — 1. 33. 2. 23. 3. 22. 4. 42. 5. 51. 6. 71.
7. 52. 8. 61. 9. 213. 10. 233. 11. 428. 12. 424.
13. 24. 14. 25. 15. 34. 16. 45. 17. 432. 18. 343.
19. 244. 20. 241.

Page 36. — 1. 21 stamps. 2. 31. 3. 21. 4. 22. 5. 33.
6. 42. 7. 22. 8. 34. 9. 42. 10. 32. 11. 62. 12. 83.
13. 55. 14. 94. 15. 72. 16. 413. 17. 53. 18. 62.
19. 72. 20. 31. 21. 21. 22. 28. 23. 25. 24. 21.
25. 24. 26. 47. 27. 241. 28. 332.

Page 37. — 1. 27. 2. 31. 3. 32. 4. 26. 5. 21. 6. 24.
 7. 13. 8. 16. 9. 15. 10. 12. 11. 14. 12. 13. 13. 14.
 14. 12. 15. 11. 16. 9. 17. 16. 18. 61. 19. 43. 20. 31.
 21. 21. 22. 21. 23. 21. 24. 21. 25. 53. 26. 65. 27. 69.
 28. 51. 29. 73. 30. 43. 31. 44. 32. 53. 33. 64. 34. 71.
 35. 62. 36. 47. 37. 136. 38. 123. 39. 126. 40. 226.
 41. 113. 42. 116. 43. 225. 44. 122. 45. 52. 46. 54.
 47. 42. 48. 124. 49. 33. 50. 62. 51. 231.

Page 38. — 1. 13 hr. 2. 12 hr. 3. 23 miles. 4. 22 miles.
 5. 17 miles; no. 6. 67. 7. 64. 8. 94. 9. 61. 10. 141.
 11. 151. 12. 135. 13. 233. 14. 142. 15. 123. 16. 367.
 17. 529. 18. 183. 19. 853. 20. 319. 21. 916. 22. 528.
 23. 245. 24. 472. 25. 713. 26. 452. 27. 453. 28. 736.
 29. 425. 30. 953. 31. 514. 32. 736. 33. 332. 34. 253.
 35. 518.

Page 39. — 1. \$3.15. 2. \$.21. 3. \$8.37. 4. \$6.13.
 5. \$7.12. 6. \$5.21. 7. \$7.18. 8. \$2.11. 9. \$3.34.
 10. \$3.18. 11. \$4.27. 12. \$4.13. 13. \$7.18. 14. \$7.21.
 15. \$.25. 16. \$.54. 17. \$.71. 18. \$.93. 19. \$.71. 20. \$.66.

Page 40. — 1. 14 strings, 32 beads left. 2. 91.
 3. 325 R 11. 4. 86 R 15. 5. 136 R 7. 6. 46 R 18.
 7. 123 R 23. 8. 62 R 6. 9. 231 R 28. 10. 45. 11. 98 R 11.
 12. 51 R 13. 13. 52 R 36. 14. \$.57 R 5¢. 15. \$1.45 R 15¢.
 16. \$.54 R 7¢. 17. \$2.17 R 13¢. 18. \$1.11. 19. \$.35 R 10¢.

Page 42. — 1. 20 times as high. 2. \$809. 3. 50 miles.
 4. 202 tons. 5. 105 bulbs. 6. 506. 7. 420. 8. 906. 9. 607.
 10. 509 R 6. 11. 609. 12. 418. 13. 840. 14. 604. 15. 438.
 16. 604. 17. 706. 18. 160. 19. 308 R 10. 20. 840.
 21. 741 R 13. 22. 503. 23. 730. 24. \$3.08 R 2¢. 25. \$1.50.
 26. \$1.50. 27. \$2.06. 28. \$1.70 R 30¢. 29. \$1.03. 30. \$3.07.
 31. \$1.40. 32. \$2.09 R 2¢.

Page 43. — 1. 7 R 3. 2. 8 R 25. 3. 8 R 15. 4. 7 R 39.
 5. 3 R 68. 6. 2 R 65. 7. 8 R 33. 8. 4 R 56.

Page 44. — 1. \$3.83. 2. 19. 3. 37. 4. 29. 5. 19.
 6. 28. 7. 29. 8. 29. 9. 27. 10. 24. 11. 19. 12. 78.
 13. 19. 14. 29. 15. 37. 16. 58. 17. 86. 18. 298.
 19. 188. 20. 291. 21. 192. 22. 186. 23. 159. 24. 378.
 25. 267. 26. 77. 27. 377 R 6. 28. 345 R 9.

Page 45. — 1. 34 crates. 2. \$3.97. 3. 4 pieces, 20 pieces
 left. 4. 7 marbles, 12 marbles left. 5. 29. 6. 19 R 7.
 7. 28 R 4. 8. 36 R 1. 9. 19. 10. 290. 11. 68. 12. 79 R 11.
 13. 49 R 36. 14. 59. 15. 69. 16. 273 R 16. 17. 363.
 18. 29. 19. 39. 20. 189. 21. 292 R 14. 22. 347 R 19.

ANSWERS

v

23. 49 R 2. 24. 66 R 24. 25. \$3.95 R 26¢. 26. \$2.88.
 27. \$4.36. 28. \$4.86. 29. \$6.70. 30. \$2.97. 31. \$3.80.
 32. \$5.73 R 28¢. 33. \$3.95. 34. \$4.80.

- Page 46. — 1. 23. 2. 28. 3. 35. 4. 36. 5. 39. 6. 45.
 7. 31. 8. 36. 9. 43. 10. 36. 11. 38. 12. 36. 13. 34.
 14. 44. 15. 2893. 16. 3193. 17. 2925. 18. 3611.
 19. 3379. 20. 3909. 21. 3232. 22. 2965. 23. 3187.
 24. 2750.

- Page 47. — 1. 399. 2. 598. 3. 190. 4. 412. 5. 297.
 6. 288. 7. 196. 8. 258. 9. 468. 10. 73. 11. 75. 12. 264.
 13. 168. 14. 219. 15. 578. 16. 88. 17. 345. 18. 58.
 19. 457. 20. 343. 21. 4260. 22. 3762. 23. 6779. 24. 5759.
 25. 2140. 26. 1640. 27. 3293. 28. 6267. 29. 5779.
 30. 1851. 31. 6179. 32. 9360. 33. 5518. 34. 6359.
 35. 5945. 36. 2431. 37. 6547. 38. 1057. 39. 7778.
 40. 5875.

- Page 48. — 1. \$1432.08. 2. \$160.16. 3. \$2750.82.
 4. \$1538.73. 5. 155,406. 6. 203,109. 7. 68,796. 8. 81,732.
 9. 312,550. 10. 322,248. 11. 111,805. 12. 357,901.
 13. 29,574. 14. 178,038. 15. 150,084. 16. 105,198.
 17. 345,594. 18. 625,950. 19. 253,330. 20. 616,140.

- Page 49. — 5. 18,625. 6. 1845. 7. 4968. 8. 21,590.
 9. 25,432.

- Page 50. — 1. 257,712. 2. 304,470. 3. 175,423.
 4. 104,704. 5. 493,640. 6. 491,790. 7. 285,824. 8. 379,370.
 9. 217,080. 10. 191,425. 11. 285,512. 12. 850,080.

- Page 51. — 1. \$1074.60. 2. \$516.75. 3. \$986.25.
 4. \$24,610. 5. \$802.72. 6. \$1900. 7. \$75,555. 8. \$287,525.
 9. 92,380 miles. 10. 1495 miles.

- Page 52. — 1. \$336. 2. 252 lb. 3. 144 lb. 4. \$1308.
 5. \$6096. 6. \$4095. 7. \$7.65. 8. \$6.51. 9. \$12.72.
 10. 268 pears. 11. 170 pens. 12. 147 ft.

- Page 53. — 1. \$652. 2. \$551.25. 3. \$14.70; \$41.88.
 4. \$2407. 5. 8760 hr. 6. 3700 apples. 7. \$10,675.
 8. \$1710.

- Page 55. — 1. A little over 28 apples. 2. A little over
 24 apples. 3. 3 R 9. 4. 3 R 6. 5. 3 R 20. 6. 7 R 11.
 7. 5 R 18. 8. 7 R 17. 9. 3 R 8. 10. 8 R 15. 11. 32 R 4.
 12. 21 R 2. 13. 21 R 52. 14. 64 R 12. 15. 66 R 35.
 16. 52 R 41. 17. 44 R 26. 18. 43 R 15. 19. 121 R 9.
 20. 233 R 7.

Page 56. — 1. 5 shelves; yes. 2. 4 cakes, 6¢ left.
 3. 3 records, 7¢ left. 4. 15 hr. 5. 97 R 20. 6. 31 R 46.
 7. 31 R 21. 8. 33 R 15. 9. 32 R 9. 10. 33 R 14.
 11. 62 R 5. 12. 73 R 12. 13. 78 R 54. 14. 63 R 23.
 15. 349 R 20. 16. 125 R 21. 17. 225 R 19. 18. 209 R 12.
 19. 143 R 23. 20. 277 R 10. 21. 331 R 7. 22. 207 R 15.
 23. 31 R 11. 24. 74 R 26. 25. 434 R 12. 26. 221 R 30.
 27. 624 R 13. 28. 737 R 8. 29. 642 R 12. 30. 408 R 13.
 31. 218 R 82. 32. 355 R 9. 33. 564 R 39. 34. 496 R 94.

Page 57. — 1. 3 R 2. 2. 2 R 5. 3. 1 R 38. 4. 3 R 6.
 5. 3 R 7. 6. 6 R 4. 7. 6 R 2. 8. 7 R 5. 9. 8 R 4.
 10. 9 R 4. 11. 9 R 58. 12. 9 R 7. 13. 7 R 11. 14. 4 R 4.
 15. 7 R 7.

Page 58. — 1. \$9.10. 2. \$.35. 3. \$.35. 4. 3 tickets.
 5. 25 flowers. 6. 31 R 12. 7. 73 R 21. 8. 61 R 3. 9. 81 R 3.
 10. 62 R 21. 11. 31 R 15. 12. 53 R 15. 13. 71 R 15.
 14. 43 R 18. 15. 71 R 4. 16. 64. 17. 64 R 11. 18. 38 R 7.
 19. 36. 20. 58. 21. 47 R 4. 22. 34. 23. 43 R 5. 24. 85.
 25. 76. 26. 602 R 22. 27. 359. 28. 621. 29. 739. 30. 604.
 31. 678. 32. 212 R 66. 33. 413. 34. 709. 35. 608.

Page 59. — 1. 1 R 1. 2. 2 R 18. 3. 1. 4. 0 R 54. 5. 2 R 17.
 6. 1 R 2. 7. 1 R 2. 8. 2 R 8. 9. 1 R 1. 10. 0 R 13.
 11. 0 R 23. 12. 1 R 1. 13. 3 R 18. 14. 0 R 43. 15. 1.
 16. 1 R 1. 17. 0 R 22. 18. 3 R 6. 19. 3 R 9. 20. 0 R 5.

Page 60. — 1. 111 miles. 2. \$1.08. 3. 11 R 1. 4. 10.
 5. 106 R 35. 6. 102 R 49. 7. 106 R 24. 8. 103 R 4.
 9. 104 R 19. 10. 101 R 14. 11. 104 R 13. 12. 104 R 10.
 13. 104 R 19. 14. 103 R 13. 15. 11. 16. 11 R 2. 17. 11 R 4.
 18. 103 R 37. 19. 105 R 20. 20. 10 R 31.

1. 75. 2. 28 R 10. 3. 87 R 25. 4. 331. 5. 63. 6. 104.
 7. 62 R 35. 8. 63 R 17. 9. 61. 10. 57. 11. 39.
 12. 87 R 64. 13. 47. 14. 117. 15. 221 R 29. 16. 571 R 30.
 17. 278. 18. 701. 19. 414. 20. 570. 21. 806.

Page 62. — 1. 243 miles. 2. 359 miles. 3. 415 miles.
 4. 376 miles. 5. 357 miles. 6. 513 miles. 7. 275 miles.
 8. 454 miles. 9. 32. 10. 51. 11. 37. 12. 17. 13. 64.
 14. 59. 15. 58. 16. 58. 17. 65. 18. 6 R 13. 19. 566 R 4.
 20. 316 R 4. 21. 426. 22. 347. 23. 83 R 2. 24. 97.
 25. 609. 26. 380 R 9. 27. 734. 28. 173. 29. 804. 30. 936.
 31. 667. 32. 944 R 7. 33. 678 R 6. 34. 625. 35. 764.
 36. 733 R 4. 37. 825 R 3. 38. 720.

Page 63. — 1. Wrong, 305 correct answer. 2. Wrong, 43 correct answer.
 3. Wrong, 310 correct answer. 4. Right.

5. Wrong, 86 correct answer. 6. Right. 7. Wrong, 335 correct answer.
 8. Wrong, 82 *R* 12 correct answer. 9. Right.
 10. Wrong, 438 *R* 6 correct answer. 11. Right. 12. Right.
 13. Wrong, 741 *R* 78 correct answer. 14. Wrong, 783 *R* 35 correct answer.
 15. Right. 16. Wrong, 372 *R* 31 correct answer.

Page 64. — 1. 13 mo. 2. 14 mo. 3. 14 wk.

1. 317. 2. 55. 3. 504. 4. 134. 5. 53 *R* 52. 6. 64.
 7. 115. 8. 58. 9. 273. 10. 42 *R* 30. 11. 66 *R* 71.
 12. 44 *R* 25. 13. 91. 14. 55 *R* 3. 15. 59. 16. 127.
 17. 32 *R* 2. 18. 109. 19. 273. 20. 322 *R* 9. 21. 508 *R* 6.
 22. 63 *R* 32. 23. 71. 24. 303. 25. 37 *R* 41. 26. 607.
 27. 685 *R* 20. 28. 515. 29. 285. 30. 650 *R* 15. 31. 610.
 32. 514. 33. 703 *R* 4. 34. 388 *R* 12. 35. 402 *R* 11.
 36. 509 *R* 42. 37. 443 *R* 42. 38. 871. 39. 440.

Page 65. — 4. \$123.75. 5. \$182. 6. 8 men. 7. 6000 lb.
 8. 80 da.

Page 67. — 1. 32° ; 76° ; 86° ; 8° below zero. 2. 6° .
 3. 32° . 4. 12° . 5. 46° ; yes. 7. 78° .

Page 68. — 1. \$20.23. 2. 165 miles. 3. \$8.87. 4. \$4.90.
 5. \$.27. 6. 12 mo. 7. 277 children. 8. 85.

Page 69. — 1. 3456 plants. 2. 211 dozen; \$88.62.
 3. \$38.79. 4. \$.74. 5. \$2.27. 6. \$356.75. 7. 15 pieces.

Page 70. — 1. 471. 2. 525. 3. 547. 4. 395. 5. 508.
 6. 380. 7. \$278.86. 8. \$524.52. 9. \$107.81. 10. \$229.94.
 11. 76,483. 12. 303,030. 13. 130,410. 14. 370,980.
 15. 152,250. 16. 293,811. 17. 21 *R* 2, or 21 $\frac{1}{2}$. 18. 42 *R* 7,
 or 42 $\frac{1}{2}$. 19. 51 *R* 5, or 51 $\frac{1}{2}$. 20. 103. 21. 150. 22. 65.
 23. 225. 24. 224. 25. 83. 26. 35 *R* 2. 27. 171 *R* 3.
 28. 150. 29. 209. 30. 67. 31. 447. 32. 739. 33. 527.
 34. 964 *R* 7. 35. 764. 36. 637. 37. 845 *R* 70.

Page 72. — 8. 18,023,104. 9. 13,150,079. 10. 40,006,007.
 11. 156,000,200. 12. 7,500,000. 14. 999,999; 100,000;
 9,999,999; 1,000,000.

Page 74. — 1. 1808. 2. \$7.50. 4. 34 volumes. 5. \$20.
 6. The nickel. 7. 31; 56; 75; 1499. 8. 63; 102; 2110;
 1855. 9. 97; 210; 1610; 1905. 10. 49; 601; 640; 1492.
 11. XLVIII; LXXIX; CIV; DCXXXVI; MCCXX;
 MDCCCLXXXIV. 12. LXIV; XCIX; CDLXXXVII;
 DCCCXLIH; MDXXXV; MCMXV, or MDCCCCXV.

Page 75. — 1. 588. 2. 505. 3. 504. 4. 571. 5. 402.
 6. 531. 7. 123,516. 8. 79,110. 9. 111,359. 10. 141,007.
 11. 60. 12. 57. 13. 66. 14. 60. 15. 68. 16. 59. 17. 49.

Page 76. — 1. 41,349. 2. 37,007. 3. 38,624. 4. 38,071.
 5. 44,139. 6. 36,033. 7. 40,066. 8. 43,743. 9. \$965.11.
 10. \$1052.09. 11. \$1011.35. 12. \$1507.33. 13. \$2049.27.
 14. \$1534.63. 15. \$3155.72. 16. \$2095.61.

Page 77. — 1. 139 stamps. 2. 551 people. 3. \$1695.
 4. \$119.53. 5. \$3876.39. 6. \$2684.36. 7. \$236.90.
 8. \$5791.37. 9. \$4571.84. 10. \$6895.44. 11. \$7725.08.
 12. \$1088.57. 13. \$4689.02. 14. \$5372.99. 15. \$139.60.
 16. \$5957.69. 17. \$3907.86. 18. \$2905.57. 19. \$3898.29.
 20. \$8247.05. 21. \$2950.54. 22. \$6633.79. 23. \$8175.87.
 24. \$1371.55.

Page 78. — 1. \$1813.50. 2. 119,106. 3. 576,008. 4. 374,067.
 5. 230,728. 6. 312,650. 7. 600,750. 8. 99,900. 9. 215,330.
 10. 565,110. 11. 316,750.

Page 79. — 1. \$411.75. 2. \$414.00. 3. \$486.75.
 4. 244,545. 5. 38,055. 6. 563,652. 7. 149,823. 8. 316,125.
 9. 510,874. 10. 795,626. 11. 488,948. 12. 834,426.
 13. 197,443. 14. 475,020. 15. 458,900. 16. 259,440.
 17. 242,530. 18. 255,780. 19. \$8171.86. 20. \$3093.75.
 21. \$6657.58. 22. \$733.32. 23. \$1851.21. 24. 5,560,320.
 25. 5,372,100. 26. 5,704,140. 27. 2,577,700. 28. 673,180.

Page 81. — 1. 71. 2. 73 R 2. 3. 65. 4. 31 R 16. 5. 53.
 6. 27 R 3. 7. 68. 8. 69 R 15. 9. 67. 10. 39.
 11. 521 R 9. 12. 730. 13. 761 R 13. 14. 297. 15. 756 R 6.

Page 82. — 1. 76 R 30. 2. 62 R 4. 3. 97 R 29.
 4. 46 R 31. 5. 57 R 35. 6. 74 R 72. 7. 51. 8. 71.
 9. 53 R 42. 10. 83. 11. 41. 12. 62 R 42. 13. 416 R 11.
 14. 583 R 32. 15. 747 R 42. 16. 402 R 14. 17. 623.
 18. 413 R 9. 19. \$.28.

Page 83. — 1. 49 jelly beans, 15 jelly beans left. 2. 13 eggs,
 5¢ left. 3. \$.48. 4. \$1.75. 5. 66 R 52. 6. 240. 7. 57.
 8. 61. 9. 56 R 40. 10. 78 R 12. 11. 67 R 26. 12. 270.
 13. 39. 14. 41. 15. 104. 16. 203. 17. 77. 18. 622 R 10.
 19. 625. 20. 371 R 40. 21. 702. 22. 206. 23. 492.
 24. 354. 25. 509. 26. 507. 27. 603. 28. 236.
 29. 557 R 11. 30. 2775 R 5. 31. 2093 R 3. 32. 722 R 20.
 33. 273 R 33. 34. 403. 35. 510. 36. 264. 37. 654 R 42.
 38. 223 R 41. 39. 414. 40. 827 R 22. 41. 810. 42. 517.
 43. 408 R 13.

Page 84. — 2. $194\frac{3}{4}$ miles. 3. 120 miles; no. 4. 76 lb.
 5. 85. 6. \$.63.

Page 85. — 1. 2. 2. 2. 3. 3. 4. 4. 5. 2. 6. 6. 7. 4.
8. 2. 9. 2. 10. 3. 11. 2. 12. 2. 13. 12. 14. 24. 15. 26.
16. 22. 17. 4. 18. 3. 19. 40 suits. 20. 8 mo.

Page 87. — 1. 23 miles. 2. 21 miles. 3. 22 miles.
4. 24 miles. 5. Mr. Ross. 6. 21. 7. 13. 8. 32. 9. 25.
10. 16. 11. 24. 12. 26. 13. 17. 14. 31. 15. 24 R 11.
16. 23 R 83. 17. 17. 18. 117 R 249. 19. 367.
20. 213 R 198. 21. 21. 22. 36. 23. 82 R 119. 24. 75.
25. 41 R 301. 26. 71. 27. 709. 28. 431 R 411. 29. 351.

Page 88. — 1. 13 times. 2. 34. 3. 28. 4. 27. 5. 19.
6. 19. 7. 28. 8. 34. 9. \$.79. 10. \$.46. 11. \$.76. 12. \$.85.
13. \$1.91. 14. \$3.42. 15. \$1.81.

Page 90. — 1. 144 miles. 2. Slightly over 27 miles;
28 da. 15 hr. 3. 22 R 78. 4. 24 R 118. 5. 14 R 125.
6. 19 R 391. 7. 20. 8. 31. 9. 26. 10. 17 R 250. 11. 21.
12. 211. 13. 109. 14. 129 R 65. 15. 224 R 22.
16. 97 R 800. 17. 132. 18. 208. 19. 174 R 68. 20. 31 R 50.
21. 34. 22. 260. 23. 25 R 25. 24. 57. 25. 31 R 36.
26. 204. 27. 61. 28. 71 R 42. 29. 73. 30. 52.

Page 92. — 1. 36 in.; 9 in. 2. 27 in. 3. 18 in. 7. 8; 6;
1500. 8. 30; 6; 45. 9. 2; 6; 40. 10. 6; 12; 10.
11. 2; 14; 9.

Page 93. — 1. 27¢. 2. 36¢. 3. 25¢. 4. 10¢; 20¢; 15¢;
30¢; 35¢. 6. \$1.08. 7. \$.96. 8. \$.85. 9. \$1.12. 10. 27;
24; 33; 78; 267; 339. 11. 54; 48; 66; 156; 534; 678.

Page 94. — 1. \$24. 2. \$6.25. 3. \$1.90; \$.95. 4. \$2.10.
5. \$5.25; \$1.75. 6. 96. 7. 420. 8. 242. 9. 66. 10. 217.
11. 684. 12. 369. 13. 348. 14. \$.98. 15. \$2.22. 16. \$3.98.
17. \$3.36. 18. \$1.00. 19. \$2.31. 20. \$2.22. 21. \$5.65.
22. \$41.73. 23. \$61.00. 24. \$29.73. 25. \$62.14. 26. \$62.95.
27. \$35.37. 28. \$11.08. 29. \$29.75.

Page 95. — 3. \$1.25. 4. 55¢. 5. 68¢. 6. \$1.10.

Page 96. — 1. \$29.25. 2. \$10.44. 3. \$9.35. 4. \$12.25.
5. \$2.25. 6. \$195.75. 7. \$10.50. 8. \$1.72. 9. 30¢.
10. \$3.78. 11. \$1.35. 12. 50¢. 13. 27¢. 14. \$1.56.
15. \$2.53. 16. \$7.00. 17. \$3.15. 18. \$1.14. 19. \$2.97.
20. \$2.59. 21. \$3.00. 22. \$8.17. 23. 99¢. 24. \$2.96.
25. \$1.15. 26. \$2.03. 27. 80¢. 28. \$1.36. 29. \$1.72.
30. \$5.27. 31. \$13.86. 32. \$9.10. 33. \$21.09. 34. \$15.80.
35. \$8.36. 36. \$49.40. 37. \$11.78. 38. \$17.22.

Page 99. — 1. $3\frac{1}{2}$ lb. 2. $2\frac{1}{4}$ yd. 3. $1\frac{1}{4}$. 4. 3. 5. 2.
6. $1\frac{3}{8}$. 7. $1\frac{1}{5}$. 8. $1\frac{1}{2}$. 9. $1\frac{5}{8}$. 10. $2\frac{1}{3}$. 11. $1\frac{1}{8}$. 12. $1\frac{2}{3}$.
13. 3. 14. $1\frac{7}{8}$. 15. $2\frac{1}{8}$. 16. 2. 17. $2\frac{3}{4}$.

Page 100. — 4. $\frac{2}{3}$; $\frac{5}{8}$; $\frac{3}{4}$. 5. $\frac{7}{8}$. 6. $\frac{3}{8}$. 7. $\frac{5}{8}$. 8. $\frac{3}{4}$. 9. $\frac{2}{3}$. 10. $\frac{7}{8}$.

Page 101. — 1. 1 lb. 2. $1\frac{1}{8}$ in. 3. 1 lb. 4. 2. 5. $1\frac{3}{8}$.
6. 1. 7. $1\frac{1}{8}$. 8. $1\frac{1}{3}$. 9. 1. 10. $1\frac{3}{8}$. 11. 1. 12. 1. 13. $1\frac{5}{8}$.
14. $1\frac{1}{3}$. 15. $1\frac{1}{4}$. 16. $1\frac{1}{8}$. 17. 2.

Page 102. — 1. 9 lb. 2. $6\frac{1}{4}$ yd. 3. 8. 4. 6. 5. 8. 6. $9\frac{1}{4}$. 7. $10\frac{1}{3}$.

Page 103. — 1. 2 hr. 2. $1\frac{1}{2}$ hr. 3. $5\frac{1}{4}$ hr. 4. $3\frac{3}{4}$ lb.
1. $5\frac{2}{3}$. 2. 12. 3. $6\frac{3}{4}$. 4. 8. 5. $7\frac{3}{8}$. 6. 15. 7. $12\frac{3}{8}$.
8. $10\frac{5}{8}$. 9. $10\frac{1}{3}$. 10. 15. 11. $7\frac{1}{2}$. 12. $8\frac{1}{4}$. 13. $12\frac{1}{8}$.
14. $10\frac{3}{4}$. 15. 10. 16. $17\frac{1}{2}$. 17. $20\frac{1}{4}$. 18. $11\frac{5}{8}$. 19. $19\frac{3}{8}$. 20. 19.

Page 104. — 5. $\frac{3}{4}$ hr. 6. $1\frac{1}{4}$. 7. 1. 8. $1\frac{3}{4}$. 9. $5\frac{3}{4}$. 10. $12\frac{1}{4}$.
11. $1\frac{1}{4}$. 12. 1. 13. $1\frac{1}{2}$. 14. $8\frac{3}{4}$. 15. $10\frac{1}{2}$.

Page 107. — 1. $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{2}$; $\frac{2}{3}$; $\frac{1}{6}$; $\frac{1}{3}$; $\frac{1}{3}$. 2. $\frac{3}{4}$ yd.

Page 108. — 1. $\frac{1}{2}$ lb. 2. $\frac{3}{4}$ in. 3. $\frac{1}{2}$ lb. 4. 1 mile. 5. $\frac{1}{2}$.
6. $\frac{3}{4}$. 7. $\frac{1}{2}$. 8. $\frac{1}{3}$. 9. $\frac{3}{4}$. 10. $\frac{3}{4}$. 11. $1\frac{1}{2}$. 12. $1\frac{3}{4}$. 13. $1\frac{1}{4}$.
14. $2\frac{1}{2}$. 15. $7\frac{1}{2}$. 16. $10\frac{3}{4}$. 17. 6. 18. $9\frac{1}{4}$. 19. $8\frac{1}{2}$.

Page 109. — 1. $\frac{5}{8}$. 2. $\frac{7}{8}$. 3. $\frac{7}{8}$. 4. $1\frac{1}{8}$. 5. $1\frac{3}{8}$. 6. $\frac{7}{8}$.
7. $\frac{5}{8}$. 8. $1\frac{1}{8}$. 9. $1\frac{1}{4}$. 10. $\frac{3}{4}$. 11. 1. 12. $1\frac{1}{2}$. 13. $1\frac{1}{4}$.
14. $2\frac{1}{4}$. 15. $\frac{3}{4}$.

Page 110. — 1. $9\frac{1}{4}$ lb. 2. $5\frac{7}{8}$ lb. 3. $11\frac{1}{4}$. 4. $16\frac{1}{4}$. 5. $7\frac{3}{8}$.
6. $7\frac{1}{4}$. 7. $7\frac{7}{8}$. 8. $10\frac{3}{8}$. 9. $11\frac{3}{4}$. 10. $8\frac{1}{8}$. 11. $11\frac{3}{8}$. 12. $15\frac{3}{8}$.
13. 8. 14. $12\frac{1}{4}$. 15. $16\frac{1}{2}$. 16. $16\frac{1}{4}$. 17. $9\frac{3}{4}$.

Page 111. — 1. 589. 2. 601. 3. 488. 4. 596. 5. 425.
6. 620. 7. 47,038. 8. 41,755. 9. 28,290. 10. 40,484.
11. 44,726. 12. 41,161. 13. 34,006. 14. 45,333.

Page 112. — 1. 3217. 2. 1773 miles. 3. \$10,250.
4. \$7873.83. 5. \$2934.57. 6. \$6981.83. 7. \$2092.65.
8. \$3363.30. 9. \$5984.48. 10. \$6145.80. 11. \$5610.79.
12. \$3394.57. 13. \$3667.97. 14. \$4601.84. 15. \$1416.92.
16. \$6267.52. 17. \$1367.85. 18. \$2584.55.

Page 113. — 1. $\frac{3}{8}$; $\frac{1}{4}$; $\frac{1}{8}$. 2. $\frac{1}{2}$ yd. 3. $\frac{1}{4}$. 4. $\frac{3}{8}$. 5. $\frac{1}{8}$.
6. $\frac{1}{4}$. 7. $\frac{3}{4}$. 8. $\frac{1}{2}$. 9. $\frac{3}{4}$. 10. $\frac{1}{2}$. 11. $\frac{3}{8}$. 12. $\frac{3}{4}$. 13. $\frac{1}{2}$.
14. $\frac{1}{2}$. 15. $\frac{1}{4}$; $\frac{1}{8}$; $\frac{1}{2}$; $\frac{3}{8}$; $\frac{5}{8}$; $\frac{1}{3}$; $\frac{3}{4}$; $\frac{7}{8}$; $\frac{2}{8}$, or $\frac{1}{4}$.

Page 114. — 1. $65\frac{1}{2}$ lb. 2. Gus; $2\frac{1}{4}$ lb. 3. $1\frac{1}{2}$ lb. 4. 67 lb.
5. $14\frac{1}{2}$ lb. 6. $2\frac{1}{2}$. 7. $1\frac{1}{8}$. 8. $3\frac{1}{4}$. 9. $5\frac{1}{3}$. 10. $2\frac{1}{3}$. 11. $4\frac{3}{8}$.
12. $1\frac{1}{4}$. 13. $2\frac{1}{4}$. 14. $5\frac{3}{8}$. 15. 1. 16. $3\frac{3}{4}$. 17. $3\frac{3}{8}$. 18. 6.
19. $1\frac{1}{4}$. 20. $1\frac{1}{2}$.

Page 115. — 2. $2\frac{1}{8}$ min. 3. $\frac{1}{8}$ min.

1. $\frac{1}{4}$. 2. $\frac{1}{8}$. 3. $\frac{7}{8}$. 4. $\frac{1}{5}$. 5. $\frac{1}{8}$. 6. $1\frac{1}{8}$. 7. $5\frac{1}{4}$. 8. $2\frac{3}{8}$.
9. $6\frac{1}{8}$. 10. $1\frac{1}{8}$. 11. $4\frac{3}{8}$. 12. $3\frac{1}{4}$. 13. $1\frac{5}{8}$. 14. $5\frac{1}{8}$. 15. $3\frac{1}{8}$.

16. $2\frac{1}{8}$. 17. $2\frac{3}{8}$. 18. $\frac{1}{4}$. 19. $2\frac{1}{8}$. 20. $6\frac{1}{8}$. 21. $1\frac{7}{8}$. 22. $5\frac{5}{8}$.
23. $\frac{1}{4}$. 24. $4\frac{5}{8}$. 25. $4\frac{5}{8}$.

Page 116. — 1. Red, $16\frac{3}{4}$ yd.; blue, $11\frac{7}{8}$ yd.; yellow, $13\frac{1}{8}$ yd.; white, $10\frac{1}{4}$ yd.; pink, $7\frac{3}{4}$ yd.; green, 10 yd. 2. $69\frac{3}{4}$ yd.; \$16.74.

- Page 117. — 1. \$.75 $\frac{1}{2}$. 2. \$.08 $\frac{3}{4}$. 3. \$.49 $\frac{1}{2}$. 4. $7\frac{1}{2}$. 5. $24\frac{1}{2}$.
6. $15\frac{3}{4}$. 7. $9\frac{3}{4}$. 8. $11\frac{1}{4}$. 9. $23\frac{1}{2}$. 10. $37\frac{1}{2}$. 11. $32\frac{1}{4}$. 12. $22\frac{1}{2}$.
13. $100\frac{1}{2}$. 14. $42\frac{1}{3}$. 15. $102\frac{1}{3}$. 16. $45\frac{2}{3}$. 17. $55\frac{1}{4}$. 18. $163\frac{1}{2}$.
19. \$.62 $\frac{1}{2}$. 20. $144\frac{3}{4}$ miles.

- Page 118. — 1. 4 P.M.; 4 biscuits. 2. 5.30 P.M.; 9 examples.
3. 6.30 P.M. 4. 6.45 P.M.

- Page 120. — 1. \$1.60. 2. \$1.04. 3. \$10.62. 4. \$11.05.
5. 1170 miles. 6. 69 pieces.

- Page 121. — 1. 84 chickens. 2. 66 chickens. 3. 2244 lb.;
\$67.32. 4. \$91.98. 5. \$45.44. 6. \$123.50. 7. \$76.96.

- Page 122. — 4. 6 min. 5. 50 min. 6. 6 sec.; 9 sec. 7. 30.
8. 45. 9. 240. 10. 120. 11. 15. 12. 90.

- Page 123. — 4. Train No. 4, 50 min. late; Train No. 23,
35 min. late. 5. Train No. 127.

- Page 125. — 1. New Year's Day, Jan. 1; Lincoln's Birthday,
Feb. 12; Washington's Birthday, Feb. 22; St. Valentine's Day,
Feb. 14; Decoration Day, May 30; Independence Day, July 4;
Columbus Day, Oct. 12; Christmas, Dec. 25. 8. 33 da.
9. 10 yr.; 24 yr.

- Page 127. — 1. 264 ft.; 20 blocks. 2. $\frac{1}{2}$ mi.; 1 mi.
4. $1\frac{1}{2}$ mi. 5. 80 rd.; 440 yd. 6. 6 liners. 7. 736 ft. 8. 160;
24; 10,560. 9. 80; 33; 80. 10. 15,840; 144; 20. 11. 2640;
1320; 2. 12. 880; 660; 330.

- Page 128. — 2. \$4.80. 3. 100 ft. 4. \$4.00. 6. 880 ft.; 6 times.

- Page 130. — 4. 12 sq. in. 5. 20 sq. in. 6. 21 sq. in.
7. 24 sq. in. 8. 24 sq. in. 9. 7 sq. in. 10. 60 sq. in.
11. 84 sq. in. 12. 70 sq. in. 13. 102 sq. in. 14. 104 sq. in.
15. 105 sq. in.

- Page 131. — 5. 15 sq. ft. 6. 72 sq. ft. 7. 14 sq. ft.
8. 30 sq. ft. 9. 18 sq. ft. 10. 32 sq. ft. 11. 7 sq. ft.
12. 44 sq. ft. 13. 30 sq. ft. 14. 91 sq. ft. 15. 76 sq. ft.
16. 126 sq. ft. 17. 360 sq. ft. 18. Helen's room; 1 sq. ft.
19. 168 sq. ft.

- Page 132. — 2. \$75.20. 3. 14 sq. yd.; 46 sq. yd.
4. 14 sq. yd. 5. 3 sq. yd. 6. 12 sq. yd. 7. 9 sq. yd.
8. 63 sq. yd. 9. 1 sq. yd. 10. 9 sq. yd. 11. 143 sq. yd.
12. 378 sq. yd. 13. 273 sq. yd. 14. 20 sq. ft.; 20 sq. yd.

Page 133. — 4. 12 sq. yd. 5. 12 sq. yd. 6. 144. 7. 72.
8. 432. 9. 18. 10. 3. 11. 2.

Page 134. — 1. 6 in.; 2 in. 5. 4 ft.; 8 ft.; 16 ft. 7. 2 yd.;
8 yd.; 12 yd.

Page 135. — 2. 2 ft.; 4 ft.; 6 ft. 3. 6 ft. 4. 13 ft. 5. 78 sq. ft.
6. 6 ft.; 2 ft.; 12 sq. ft. 7. 3 ft.; 6 ft. 8. 2 ft.; 8 ft.; 4 ft.;
8 ft.; 16 sq. ft.; 32 sq. ft.; 2 times as large.

Page 136. — 1. 2 mi.; 3 mi.; 4 mi.; 8 mi.; 12 mi. 3. 3 mi.
4. 6 mi. 5. 4 mi.; 2 mi. 6. 8 mi.

Page 137. — 1. 92. 2. \$.19. 3. \$.93. 4. $\frac{1}{2}$ lb.
5. 4 hr. 55 min. 6. \$59. 7. 48 sq. ft.

Page 138. — 7. 71. 8. 70. 9. 67. 10. 71. 11. 64.
12. 58. 13. 60. 14. \$610.52. 15. \$345.75. 16. \$7921.99.
17. \$2554.79. 18. \$4632.40. 19. \$4381.39. 20. \$1086.30.
21. \$2428.38.

Page 139. — 1. 38,119. 2. 34,360. 3. 40,750. 4. 37,931.
5. \$436.13. 6. \$389.04. 7. \$321.22. 8. \$394.43. 9. 211,551.
10. 387,984. 11. 732,552. 12. 296,700. 13. 412,760.
14. 270,830. 15. 768,553. 16. 764,725. 17. 223,010.
18. 315,520. 19. 105 R 10. 20. 151 R 38. 21. 470.
22. 675 R 19. 23. 205 R 108. 24. 208. 25. 269 R 150.
26. 508. 27. 652 R 347.

Page 140. — 1. 1. 2. $\frac{3}{4}$. 3. $\frac{7}{8}$. 4. $9\frac{3}{4}$. 5. $6\frac{1}{2}$. 6. 12.
7. $1\frac{1}{2}$. 8. $1\frac{5}{8}$. 9. $1\frac{3}{4}$. 10. $13\frac{1}{8}$. 11. $15\frac{1}{8}$. 12. $14\frac{1}{8}$. 13. $\frac{7}{8}$.
14. $1\frac{1}{2}$. 15. $1\frac{1}{4}$. 16. $16\frac{1}{4}$. 17. $16\frac{3}{4}$. 18. $18\frac{7}{8}$. 19. $2\frac{1}{4}$.
20. $5\frac{1}{2}$. 21. $6\frac{1}{2}$. 22. $3\frac{1}{4}$. 23. $5\frac{3}{4}$. 24. $10\frac{1}{8}$. 25. $6\frac{1}{8}$. 26. $4\frac{3}{8}$.
27. $5\frac{5}{8}$. 28. $2\frac{3}{8}$. 29. 81. 30. 70. 31. 100. 32. 60.
33. \$3.48. 34. \$6.30. 35. \$2.42. 36. \$1.65. 37. \$3.20.
38. \$2.85. 39. \$4.76. 40. \$2.70. 41. \$7.81. 42. \$7.93.
43. \$3.04. 44. \$3.15. 45. \$16.53.

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